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Fruit Growers Association

of Adams County

Pennsylvania

ORGANIZED DECEMBER 18, 1903

PROCEEDINGS

of the

SECOND ANNUAL CONVENTION

held in

FRUIT GROWERS HALL, BENDERSVILLE, PA.

WEDNESDAY, THURSDAY AND FRIDAY

DEC. 12, 13, 14, 1906

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CONSTITUTION

PREAMBLE.

Being interested in fruit growing and believing that, by organization, we may materially advance our common interests, we hereby adopt the following Constitution and By-Laws:

ARTICLE I.—*Name.*

This Association shall be known as The Fruit Growers' Association of Adams County.

ARTICLE II.—*Object.*

The object of this Association shall be to encourage the co-operation of the fruit growers of Adams County for the protection and advancement of their common interests.

1st. By securing and disseminating such scientific and practical information as shall promote the general advancement of the fruit growing interests in this county, and shall tend to the improvement of the quality and quantity of our products.

2nd. By securing such legislation as may be advantageous, and preventing that which may be detrimental.

3rd. By securing such improved facilities in transportation as shall tend to give us more expeditious and economical distribution.

4th. By endeavoring to secure a better and more uniform system of packing and package.

5th. By devising some system of marketing our products which will open up and develop the markets and give to the grower a fair and remunerative return.

6th. And by endeavoring to obtain such improved systems of crop reporting as shall furnish, through co-operation with other similar Associations, accurate information concerning production; thereby enabling the fruit grower to know the exact situation.

ARTICLE III.—*Membership.*

1st. Candidates for membership may be elected by a majority vote of the members present, and upon the payment of $1.00 into the treasury shall be entitled to membership until the next Annual Meeting.

2nd. Any member may renew his membership by the payment of annual dues, but upon failure to pay dues within three months after Annual Meeting, shall require re-election.

3rd. No member shall receive the benefit of commissions or of co-operative buying by the Association, to an amount greater than $1.00 for the term of one year after election to membership.

ARTICLE IV.—*Dues.*

The annual dues of this Association shall be One Dollar ($1.00) payable to the treasurer at the meeting immediately preceding the annual meeting, for which the treasurer shall issue a receipt, this receipt to constitute a certificate of membership for the succeeding year.

ARTICLE V.—*Officers.*

Its officers shall consist of a President, one Vice President, a Recording Secretary, a Corresponding Secretary, a Treasurer, and an Executive Committee of five (5) members, consisting of the President, Recording Secretary and three others, all of whom shall be elected by ballot at each annual meeting for the term of one year or until their successors shall be chosen.

ARTICLE VI.—*Quorum.*

Five (5) members shall constitute a quorum for the transaction of business.

ARTICLE VII.—*Amendments.*

The Constitution and By-Laws of this Association may be amended at any regular meeting by a two-thirds vote of the members present, a notice of the proposed amendment having been presented in writing at a previous regular meeting.

BY-LAWS

ARTICLE I.—*Duties of President.*

The President shall preside at all meetings of the Association and have a general supervision of its affairs.

ARTICLE II.—*Duties of Vice President.*

The Vice President shall preside at any meeting in the absence of the President, and may act on the Executive Committee in case of the President's absence.

ARTICLE III.—*Duties of Recording Secretary.*

The Recording Secretary shall write the minutes of the meetings of the Association and have charge of its Records and Reports.

ARTICLE IV.—*Duties of Corresponding Secretary.*

The Corresponding Secretary shall conduct the correspondence of the Association, and shall receive for so doing his necessary expenses for stationery, postage, etc. He shall also act as Recording Secretary in the absence of that officer.

ARTICLE V.—*Duties of Treasurer.*

The Treasurer shall receive and keep an accurate account of all moneys belonging to the Association, paying out same on an order of the Association, signed by the President. He shall make a report of all receipts and disbursements at the annual meeting or at any time at the request of the Association. He shall mail a notice of dues to all members one week prior to the November meeting, at which time all dues are payable, and shall issue certificates of membership in exchange for all dues received. He shall also keep a roll of members who have complied with Article IV. of the Constitution and embody same in his annual report.

ARTICLE VI.—*Duties of the Executive Committee.*

The Executive Committee shall have general supervision of the affairs of the Association, auditing all bills and accounts and carrying out the purposes of the Association. They shall also prepare a program for each meeting, same to be announced at the preceding meeting.

ARTICLE VII.—*Meetings.*

There shall be a regular meeting of the Association on the second Saturday of each month at 7:30 P. M., unless otherwise ordered. The meeting held in December to be regarded as the Annual Meeting. Special meetings may be convened by the Executive Committee at such time as they may appoint.

ARTICLE VIII.—*Initiation of Officers.*

All new officers shall assume the duties of office at the opening of the meeting immediately following the one at which they were elected. Except that the newly appointed Executive Committee shall prepare and announce at the January meeting the program for the February meeting.

ARTICLE IX.—*Order of Business.*

1st. Reading of minutes of previous meeting.
2nd. Nominations and elections.
3rd. Reports of committees.
4th. Deferred business.
5th. Communications.
6th. New business.
7th. Discussion of questions.

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PROCEEDINGS

OF THE

Second Annual Convention

OF THE

FRUIT GROWERS ASSOCIATION

OF

ADAMS COUNTY, PA.

The Second Annual Convention of the Fruit Growers Association of Adams County convened at 2 o'clock on Wednesday afternoon, December 12, 1907, in Fruit Growers' Hall, Bendersville. The convention was called to order by the President, Robert M. Eldon, and was opened with prayer by Rev. John H. Peters. President Eldon welcomed the guests of the Association with the following well chosen remarks:

ADDRESS OF WELCOME.

Ladies and Gentlemen: We are very glad to see you here today. We are holding our Second Annual Convention, and we hope that this one may be equally as pleasant as the last one.

To those who come here from month to month I need extend no especial welcome. Their presence with us shows they like to be here and we are always glad to have them.

Our organization is three years old. While we are young, we are a lusty infant—in fact, we intend to grow. Our membership is gradually increasing, and we hope that before the end of this week we shall number at least 100. Our membership is not confined to the immediate locality; quite a number live in other counties; we

have members from several other states. We are particularly glad to welcome these non-resident members, because they bring to us ideas from their home localities which are valuable.

We have had very pleasant meetings here, and anticipate even greater pleasure in those which are to come. We look forward this week to very delightful sessions. We hope that you will feel very much at home. To those gentlemen who are to address us we extend a particularly cordial welcome. We are glad to meet you, and we hope that you will be as pleased with us as we feel sure that we will be with you, so that you will feel like coming to us again. We extend to you a very hearty welcome.

I need not to go into particulars in regard to the growth of our organization or the size of our business. We hope that this may increase even as our membership. We do not say a great deal as to what we are doing, but we have made noise enough to be heard, and any who have passed us by will now sit up and listen.

To any who wish to become members, we extend a welcome,—we feel that they are one of us.

I will not close without saying one thing about our hobby. Every locality has its hobby. Our present one is apples, particularly the York Imperial.

I do not see any reason why if we now have 30,000 trees, in 10 years we should not have 100,000 trees; and if our crop now is 100,000 bushels, in 10 years it should be 1,000,000 bushels, and with the quantity, the buyers must come.

I bid all the members and all the strangers a cordial welcome to our meetings.

MR. J. OTTO THILOW, Secretary of the Henry A. Dreer Seed Company, Philadelphia, Pa., responded on behalf of the guests.

RESPONSE TO ADDRESS OF WELCOME.

By MR. J. OTTO THILOW.

Mr. President, Ladies and Gentlemen: I assure we appreciate this cordial welcome extending to us the privilege of gathering here, vieing with one another in the exchange of ideas pertaining to a vocation not like unto any other under the sun, and none other so noble, because we are dealing with nature, and she responds to every effort put forth by those who regard her resources.

This is the second annual meeting of this Association, and why is there such an organization as The Fruit Growers' Association? Simply because we realize that "in union there is strength." The people of this country move actively; the markets must necessarily be corrospondingly vigilant; in order to produce what we believe to be the best we must get the best information, which no school can give as experience does. We are organized, we meet with our fellowmen, who we believe have something of value to tell us, and

we are taking advantage of the well known liberality of our horticultural brethren. The new methods and ideas represented here will be applied, and results reported for the benefit of all. It is therefore necessary that we unite. No one can estimate the value of our coming together; a necleus started here grows into profit to the one who applies the information he receives, and an influence permeates those who hear of his success.

I am glad, Mr. President, to be remembered with those that have been enrolled as craftsmen in the time honored institution of "Horticulture." Her days of existence are not known, yea, its beginning was with the Garden of Eden, when the fruit, of which you will hear many discussions at this meeting, by its lucious qualities, tempted man at the beginning of the world.

And because of the constant changes to better and more beautiful things in this, nature's realm, we must acknowledge that horticulture is a living literature. Our native flora has enriched the gardens of our own country and of the world. In 1878 the most famous botanical gardens of the country were established at Philadelphia by John Bartram. In 1804 one at Charlestown, S. C., and one in Maryland. In 1805 one in Cambridge, Mass. In the beginning of the colonization of this country, all the varieties of apples were of European origin, but in 1817 over 60 per cent. of the apples recommended for cultivation were of American origin, that is, American seedlings from the original stock, showing that conditions and environment had much to do with the amelioration of the fruit. At the present time, fully 90 per cent. of the apples in the Atlantic States are of American production.

Mr. President, we owe a tribute to our active writers who keep us informed on all subjects of interest and note. We hear of some interesting titles, such as "Spooner on the Horse," "Gregory on the Squash," "Harris on the Pig," "Waugh on the Plum," "Beach on the Apple," "Allen and Brill on the Cabbage," but beside these we refer to those who have gone deep into the unfathomable depths of horticulture and given us plumb line and rule for the successful pursuit of the vocation to which we are devoted. I refer to Roland Green, Edward Sayre, McMahon, Paxton, Coxe, Wm. & Robt. Price, Kendrick, Ives, Manning, Henderson, Downing, Fuller, Bridgeman, Bailey.

Now, Mr. President, we often hear in the course of the addresses our good brethren tell us what they have done and intend to do, has it ever occurred to us that the woman, the wife in the home, also plays an important part in our successes? I venture the assertion that in the greater part of the failures the wife has had no part. Inasmuch as we confide in each other in our annual meetings in the exchange of ideas and experiments, so should we also submit to our wives and daughters, who are usually more intensely interested in horticulture than we are—our plans and propositions, that they may be our helpmeets in all our undertakings. Woman figured first in horticulture in this country, for in 1772 the first treatise on horticulture was written by Mrs. Logan, a florist, in Charlestown, S. C., when at the age of 70 years. She died at the age of 77.

With the opening of the present century, horticulture assumed a commercial trend, and we all know of the improvements in all the fruit and flower productions.

Mr. President, I can only add in conclusion, that if we are to meet the growing demand for horticultural products in both fruits and flowers, we must now decide for our posterity; the best is none too good, and to this end we must apply our best efforts and care, in giving only that which is best suited to the location; encourage our experiment stations that they give us remedies for the absolute extermination of scale and blight.

We must also see to it that the transportation companies assist us in delivering our products to the markets of the world cheap enough so that we may all have compensation for our labor.

POTATO CULTURE IN ORCHARDS WITH NOTES ON ORCHARD PLANTING, PRUNING AND CULTURE.

By PROF. W. F. MASSEY, Editor "Practical Farmer," Philadelphia, Pa.

Mr. President, Ladies and Gentlemen: It was with some peculiar feelings that I came into this county, for this is the first time I have been in this part of the country since nearly fifty years ago. I was a student over here in Carlisle, and in passing along the road this morning I felt like I was getting back among things that I had seen many years ago—I was almost ashamed to remember how long it had been, for I was a member of the class of 1859 over here in Dickinson College, and I have not been in Cumberland or Adams County since.

Still, it does give me a great deal of pleasure to meet with some of the men who have endeavored to do what I, as a young man, felt that this country ought to do. For in the hill country of all places is the place for the fruit grower. We have found down in Virginia, where they grow the famous Albemarle Pippins, that it will not do to plant the pippin in the general valley, but if we go up in the mountain hollows, all at once we come to a point where the red clay stops and we find a dark vegetable loam filling the rock fissures which come down from the mountain side; there the springs are breaking out, the soil is porus and well drained; and there any apple will flourish. You want that loose soil where the moisture will come freely through, which is well drained and at the same time retentive of moisture. These are the ideal conditions for the apple.

When I first went to Albemarle County where these Albemarle Pippins were growing, we had an idea that it was elevation that gave them their peculiar character. I got to studying conditions there. I found one large orchard of 50,000 trees, which was over the crest of the Blue Ridge. Up to a certain line that orchard had been productive. Above that apples were worthless. They could not understand why the lower part of the orchard shouid be productive and the remainder so unproductive, where the soil seemed to be the same. I examined other orchards where the best pippins were grown and found the same thing. Where you get above a

certain point there were no apples, and I found that point was where the springs stopped on the mountain side.

I do not like to read an address, always prefer to look people in the face when I talk to them, but in order to keep from wandering all over creation I have prepared the following paper and will present my subject under several heads. For convenience, I will consider the orchard first and take up the potato end later.

ORCHARD PLANTING AND ORCHARD CROPS.

WHAT KIND OF TREES TO PLANT.

I do not mean what varieties, but what style of trees shall we plant. Many years ago, when I was young and inexperienced I, like many others, wanted a big tree, and bought three and four-year-old trees. But I soon found that with these trees I had difficulty in making the low heads that I wanted. They had been headed back in the nursery rows, and had started a sort of head, and the nurserymen, knowing the general liking for tall trees, made the head a good ways off the ground, and I had learned that there is a serious difficulty and no advantage in a tall stem to a tree.

I found, therefore, that to be able to head my trees as I wanted them I must have younger trees, and for many years past I have planted only one-year-old trees of all sorts. These cost less at the nursery, cost less for freight, and can be shaped to suit after they are planted. Such trees are mere switches with live young buds ready to start all over the stem, and one can start the head at any point he wishes.

Several years ago I was making an address to the Virginia Horticultural Society, and spoke of the advantages of low-headed trees. Mr. Hale, the noted orchardist of Connecticut and Georgia, was present, and in the discussion following my paper, he said: "What do you want with a trunk to a tree anyway, more than enough to carry the head that makes the fruit? In my orchard of 200,000 peach trees in Georgia I have not a step ladder in the whole area, and a man once sat down on the ground under one of my trees and picked half the fruit off before he got on his feet, and there is not a tree in the orchard with more than eight inches of stem."

But the common objection urged when I speak of low headed trees is "I cannot get under such trees to cultivate them." This shows the general ignorance of plant growth. What do you want to get under the trees to cultivate them for? The only part of a tree root that is engaged in getting food from the soil, is the spreading system of rootlets at the ends of the roots that are covered with the root hairs, and these are always at or beyond where the drip of the limbs falls. The larger roots are merely for the purpose of conveying to the trees the food gathered by the root hairs near the extremities, and if cultivation extends to the outside of the limbs it is all that is needed.

In these days when spraying is essential in a well treated orchard, the ease of spraying is sufficient reason for a low-headed tree. But there are other advantages. The trees do not blow over so easily as where there is the leverage of a tall stem, the fruit is more easily gathered and the trunks are protected from sun scald.

Wanting low-headed trees, I was compelled to use yearlings, because there are on these, buds ready to start at any point.

PLANTING A TREE.

The older writers on fruits always laid great stress on the saving of all the roots in digging, but we pay little attention to this nowadays. We know, as I have said, that the feeding roots are the minute rootlets that ramify through the soil and are covered with root hairs of microscopic character. These are always lost in the digging, and if not lost will be dried up and dead in a few hours at best and before a tree can start again at getting food from the soil, new rootlets and root hairs must be formed, and we find that these are more quickly formed from clean cut ends of the roots than from the dried up fibres. Then, too, many roots will inevitably be cut and bruised in digging, and the bruised part must be cut away to prevent fermentation and decay. Therefore, in preparing a tree for planting I always prune all the roots with a sharp knife, cutting with a slope on the under side to bring the cut surface in contact with the most moist earth, pruning all the roots to about six inches long. Then in planting I put the surface soil in first and ram every inch as tight as setting a gate post. If any manure is used it is put on top after the tree is planted, and never in contact with the roots.

After setting the trees the top pruning is attended to at once. I cut back every stem to 15 inches from the ground, cutting to a bud. When the growth starts in the spring, I select the three or four best situated buds to form the main branches, and rub out all others. Some orchardists who are in favor of low-headed trees do not cut back to this point, but leave the central stem and then take side shoots low down to form the head, making in effect a sort of pyramidal head, as they think such a head carries the snow better in winter and is less liable to break with a load of fruit. But I have found the open-headed tree far better. Of course, I would not take all the branches out too nearly opposite and make a crotch at the stem, but in a tree headed back to 15 inches there may be a branch that would not be over 10 inches from the ground. The branches that come out from a central stem are just as easy to break down as one that comes from the lower trunk, the only advantage being that their place is more easily filled. At the next annual pruning the limbs made the first season are to be shortened back one-third, and in all pruning, the idea should be to keep an open-headed tree and to so dispose the branches that there will be no serious interference with each other. Much pruning in winter can be saved by giving the orchard close attention during the season of growth. I have often seen men sawing and cutting out big water sprouts from the centre of the tree in winter, when by close watching in summer there need be no water sprouts, for they can be rubbed out with the finger and thumb when starting, and the growth saved for other parts of the tree.

No one should ever make a cut on a tree without having a definite idea of what he proposes to accomplish by the cutting. We prune a tree in the dormant season for the purpose of encouraging and directing growth. We prune in summer by pinching to check growth

in a shoot that is absorbing too much to itself, and also to prevent growth that will require harder pruning in winter.

No man should be allowed to prune a tree unless he has some knowledge of tree growth, and can give a reason for the hope that is in him when making a cut. I have seen men going through the country telling the farmers that their orchards needed pruning, and offering to do it for them, and I have seen these same tree-butchers making big brush piles in an orchard, and they could not for their lives tell why they cut a single limb, and orchards all over the country have been ruined by these tramp pruners.

The fact is that an apple tree that has been properly shaped from the start and gotten into a size for producing fruit, seldom needs any pruning at all, except the summer watchfulness to rub out growth that will not be wanted, or to repair damages from wind or breakage from any cause. Get the tree into good shape and size for bearing and then put away your pruning knife and saw except for emergencies.

Once in speaking of the value of young one-year trees, a man remarked: "I work negroes, and when they are cultivating the corn in a young orchard they will run right over the little trees and tear them up." I told him that in the first place he had no business to plant corn in a young orchard. It is the worst possible crop for the young trees, as its height interferes with the proper growth of the heads, and no one can make a symmetrically headed tree if he plants such a tall growing crop as corn in an orchard. Some low growing early maturing vegetable crop is the only crop that should be allowed in an orchard, for cultivation should cease in an orchard by July, by which time the growth of the season is made, and should not be stimulated into a second growth by late cultivation, but time should be given for the wood to mature.

During the early years of an orchard, growth, rapid and symmetrical growth, is what is wanted. Therefore cultivation is desirable, and liberal fertilization. But it is well matured growth that we want. Stable manure will give us the luxuriant growth, but if not associated with a due amount of mineral matters, such as phosphoric acid and potash, it will be a weak and sappy growth. Trees as well as other crops need a balanced ration to feed upon. Few orchardists fully realize the amount of mineral matter that goes into the making of a hard-wooded tree like the apple, or into the making of a crop of fruit. A fair crop of apples, in the fruit alone, will remove more potash from the soil than three crops of wheat on the same land. And yet there are men who wonder why they cannot grow fruit as they once did, when they have been taking small grain crop, and hay crops and pasture from the orchard, seeming to think that the orchard should not only produce apples but grain too, and when it does not do both they think the climate has changed and that fruit can no longer be grown profitably.

Last winter at Institutes in Bucks County, in this State, I asked the farmers why they did not grow more apples, as they are so near the market in Philadelphia, and had a soil that I knew would grow apples. One man said that they were too far South to grow good winter apples, and could not compete with New York. I told him that in Virginia the apple growers were a good ways further South and were competing with New York successfully, and that down in

North Carolina I knew a man who has for two years successively taken the first prize for apples at the Madison Square Garden in New York in competition with the whole United States. Then I received a letter from a gentleman in the central part of the State who said that fruit culture had been attempted in Pennsylvania, but that it could never be as profitable in this State as the ordinary farm crops. All of which shows that many Pennsylvania growers do not realize the possibilities of their State, for in apples at least Pennsylvania should be able to compete with any other State. Many years ago, when I was living on the Maryland and Delaware Peninsula, and the peach orchards there were in their glory, I urged the growers to give more attention to apples. But they said the same thing as the Bucks County man, they were too far South. But nowadays since the peach has lost much of its former importance, they have turned attention to apples and are succeeding.

THE CULTIVATION OF AN APPLE ORCHARD.

I have said that some early maturing and low growing vegetable crop is the best for the young orchard. What that crop shall be depends largely on local conditions. Down in Georgia, Mr. Hale finds that the canteloupe crop is one of the best he can grow in his soil and cilmate. Down in Maryland near Washington, one grower finds that the sweet potato crop suits him well, since his soil is well suited to it and he has a good market right near by. And so in various sections different crops will be preferred.

I have been asked to speak in regard to the Irish potato crop in orchards, and will endeavor a little later to enlarge on this crop. But what I want to say in regard to cultivation in general I will state as a prelude to this. I have said that growth, well matured growth, is what we want in a young orchard. But a rapid growth is never connected with early fruiting. The varieties of apples that are the most rapid and thrifty growers are always the longest ones in getting fruitful.

For the last thirty years I have been insisting that the true method of orchard culture is to keep the orchard in grass after the trees have developed to a productive size; but the grass should be there for the trees alone and should be mown several times during the season and the cut grass left to mulch the land. Then every spring give the grass a top dressing of steamed bone and potash and the cut grass in its decay will furnish all the nitrogen needed. The only animals I would allow in the orchard would be some pigs with jewelled snouts to prevent rooting, so that they may gather up the wormy fruit, or allow the poultry to have the run of the orchard. This will result in longer lived and more healthy trees than continuous plowing.

POTATO CULTURE IN ORCHARDS.

I know of no vegetable crop better suited to the young orchard than the early Irish potato crop. It should come off the ground by the first of August, and then you have time to seed the land at once in crimson clover as a winter cover and a preparatory crop for another early crop in the spring following. The manurial needs of the potato crop and of the apple trees are very similar. Both need large percentages of phosphoric acid and potash, especially potash,

and the fertilization of potatoes will materially aid the growth of the trees.

Few farmers in the north fully realize the lavish way in which the truck growers of the south fertilize the potato crop. Not because of the poverty of their soil, for these men are working land that has been heavily manured and treated with legumes for many years and is really very fertile and well adapted to the early crops they grow. But on land that would easily make 100 bushels of corn to the acre these men never use less than half a ton of high grade fertilizer per acre for the early potato crop. They must have their crop ready by the first of June and therefore urge the growth as much as practicable, often exceeding the above amount.

For the early crop of Irish potatoes early planting is of importance, and early planting is of course a relative term. While North Carolina growers usually plant in February and reguard it as late if the season defers them until the first of March. Here the case would be different, and April would be as early as it would be practicable to prepare the land for potatoes. But even here you should be able to get the early potatoes off by the first of August, and that will be time enough for the seeding of the crimson clover. The crop following the turning under of the crimson clover would probably be better than the first crop, and I can see no reason why, with liberal fertilization, the early Irish potato crop cannot be grown a number of years in succession if clover is always turned under for it. I would never use farm manure on the potato crop, as it makes conditions favorable to the growth of the scab fungus. For the same reason I would not use lime, as that would sweeten the soil for the scab, though it might increase the crop. In fact, a slightly acid condition in the soil is better for clean potatoes, and a well compounded fertilizer will make a better crop than stable manure.

I have used and recommended a fertilizer analyzing about 4 per cent. nitrogen, 7 per cent. phosphoric acid and 10 per cent. potash. The furrows should be opened and the fertilizer distributed therein. Then turn a furrow from each side over the first one, and then reopen the furrows with a broad shovel plow. This will mix the fertilizer about equally. Then plant pieces with not less than two eyes about 15 inches apart and cover with a furrow from each side.

The first cultivation will be with a spike harrow run crosswise the rows to level the ridges made in covering. Then run the weeder as fast as any growth shows and keep the weeder going both ways until the potatoes are three inches or more high, never allowing any crust to form. After that use the cultivator. A slight hilling when laying by is an advantage in the early crop, though with late potatoes I always work as flat as practicable. But in the early season the ridge warms through more quickly than the flat surface and helps the early crop.

The grower who neglects the spraying of his potatoes to prevent the early and late blight and to destroy the Colorado beetle will certainly be beaten by those who do. When potatoes are grown on a large scale a horsepower machine with four nozzles has been found the best labor saving contrivance, as in this case four rows can be sprayed at once.

Various formulas have been given for the Bordeaux mixture, but

the one that I have found best and one easily remembered is to slake five pounds of fresh lime as for whitewash and add water enough to make 25 gallons. In another cask dissolve five pounds of sulphate of copper or bluestone in 25 gallons of water. Then having these two elevated, run them both at the same time slowly into a third cask, stirring all the time, and straining, and the mixture is then ready to use.

Any treatment to prevent fungus diseases must be used as a preventive. It will not do to wait until the blight is present, but the spraying should begin as soon as the tops are fairly developed. Then when the young of the beetles hatch add to the 50-gallon mixture one pound of the arsenate of lead. Some use Paris green but I have found that the arsenate of lead is safer and never damages the leaves. When Paris green is used add five ounces to the 50-gallon mixture. This will be readily remembered, as the lime and bluestone are each five pounds and the mixture 50 gallons and the Paris green five ounces, so the figure 5 runs all the way through. Greater safety may be insured perhaps by increasing the amount of lime, but I have never found any difficulty in the even amounts of bluestone and lime.

Where the seed or the land is infested with the scab fungus it is best to treat the seed before planting. The best treatment is to mix one pound of formalin in 30 gallons of water and soak the potatoes in this for two hours and then dry them off.

Planting by hand is a slow and laborious process and where potatoes are grown on any large scale a planter saves a great deal of labor. In fact in the growing scarcity of farm labor we will have to use machinery and horse power more and more in all the work on the farm.

PROF. MASSEY—DISCUSSION.

Question: Do you think that twig blight is contagious?

PROF. MASSEY: It can be conveyed only by bacteria which are totally unable to crawl. A gummy substance exudes from the bark covering these microscopic plants, and bees crawling over these carry the fungi to the blossoms of the trees. Limbs cut off and allowed to lie on the ground thus become sources of infestation. They should not be allowed to remain on the ground but should be taken up and burned and also the leaves which they have dropped.

Now, in regard to some insect types, there is a gentleman in this State who thinks he knows a great deal about fruit who wrote to me last year that the San José scale spread very slowly indeed and was never carried by the birds. I told him that was the principal way in which it spread, getting on the feet of birds going from tree to tree. Oh no, he said, it spreads very slowly. Why, I said, I do not know how it got over the whole country so quickly after it was discovered in Virginia. But it has certainly gotten over the United States, whether it has gone slowly or not. I know by my own early experience it was brought by the English sparrow and every tree in the neighborhood was infested.

D. GOLD MILLER: We thought that the seventeen-year locust carried the scale in our orchard. We observed trees that had been stung by the locust and on these trees we always found scale. They did not bring it there originally, but certainly transferred it from tree to tree.

PROF. MASSEY: It is very possible. A locust does not stop, cutting only in one place, he is very active, going from one tree to another. It is a very easy matter to transfer the young bugs. The locust comes at the very time when the young bugs are coming out. The old ones are never transferred. There is another scale which is never transferred. It is very common, more so than the San José scale. That is the oyster shell scale. It does not kill trees as fast as the San José scale, but will finally kill them if let alone. I have never found anything yet that would kill bark louse as effectively as whitewash.

Q.: What time would you apply the lime?

PROF. MASSEY: I would apply the lime any time during the early spring. Bark louse is pretty hard to kill, and I should apply a coat of whitewash in the late spring also, that is, before the leaves are out, but still moderately late.

Q.: Would lime, sulphur and salt answer the same purpose for the oyster shell scale as the plain whitewash?

PROF. MASSEY: I think lime, sulphur and salt would not answer the same purpose for the oyster shell scale as the plain whitewash. There is another advantage in the whitewash. I tried it on trees that were more exposed to frost than the rest of the orchard. We washed them all over with whitewash and these trees did not bloom until after one month and we thought this had kept them back. So that is one advantage in it—it keeps trees from blooming too early.

EVOLUTION OF THE VEGETABLE.

By MR. J. OTTO THILOW.

I quite agree with Prof. Massey when he says he would like to look you in the face while talking to you. I would like to do that, and if I were talking politics I would not be so particular and would do it. But when I am telling you things that you expect to profit by and which you expect to bring you information that will be of benefit to you I have to be careful what I say. After having applied myself year after year, studying night after night, I do not want to tell you something off hand which would do you no good, and therefore ask you to bear with me if I read these papers, which I feel will be helpful to you when you peruse them at your convenience. And if I

should attempt to deliver this talk without manuscript I might go rambling around the parts which are of the most importance.

After I am through with the paper I will show you some charts which probably may be of more interest to you because you will see the actual facts.

The improvement in vegetables in the past decade may be justly styled an evolution, for should the grower bring to the market in these days vegetables from beans down to tomatoes, including all the intervening sorts, his stock would be ignored and he himself be dubbed as a fossil among the old and the primitive.

As the work of amelioration has been going on among fruits and flowers, so have the specialists in vegetables applied their knowledge, skill and labor with the help of nature and produced new and sterling varieties possessing superior quality with distinct habits and productive character.

As many of the points introduced in the past decade have sent old varieties once known to us into oblivion, so have the new introductions in vegetables supplanted old sorts which in their day were branded as "Peerless," "Seek no Further," "World Beater," "Ne Plus Ultra," "Eureka," etc., and as we have learned by experience that the proper manipulation, care and attention has given to us varieties so far ahead of what we deemed good enough, we apprehend that the improvement will go on and do not now in the advanced age style them with climax names. So we are expecting even greater advances in this unfathomable realm of horticultural possibilities, which is so resourceful and susceptible of improvement that we may well say the product of today compared with that of a quarter of a century ago has been nothing short of an evolution.

Improvements in vegetables have been marked, and with the introduction of new sorts the experimenting with many of the old sorts, has improved their quality, thus bringing many of the obsolete varieties back among the standards of the new sorts. While many varieties are coming to the front, it does not prove that their quality is such as to obliterate many of the older and well tried sorts. A new variety of any of the genera which is entirely distinct and unlike its predecessors, possessing good qualities, comes to the front with some gusto which lasts a short time. The variety remains on the list and comes in regular order with the rest of ifs members; its quality and general character make an impression and it remains on the list as a new variety of note.

The public is critical, and through their constant use of vegetables where facilities afford have fixed on their lists the desirable sorts wanted.

Tastes vary, and therefore we have our preferences, such as white or green asparagus against purple; wax podded beans against the green podded—they appear more tender and brittle, yet do not possess the flavor of the green sorts. White beets because they are sweeter; small grained corn because it is sweet with deep kernel and has a small cob. And so on through the list, not always because of better quality, but often for appearance.

I will not weary you with the results of experiments and the methods of conducting same in the production of new and improved sorts, but will refer to some practical points and name some improvements which might appeal to you to be of value and at the same time interesting.

This paper is a very small part of the vegetable varieties when we compare such as come under our own observation with Bulletin No. 21 of the Department of Agriculture, which gives American varieties and synonyms for 1901 and 1902, a book of 402 pages closely written. This may give you some idea of the constant application to this, the vegetable department of plant production.

What have the improvements been and how do they benefit us? I will omit names of varieties and give some results of years of experiments and cross-breeding along with high cultivation.

Artichoke. The globe variety has been improved by cultivation. As a very small portion of the globe is edible it is necessary to grow free and full. The bulb or earth tuber remains the same and is improved by separation and transplanting. This variety is considered to be stock food only, but when properly prepared is excellent for table use.

Asparagus. Through high cultivation and deep planting this vegetable has gained a prominent position in the garden and also in a commercial way for canning. While for table use the American prefers it green, the foreigner prefers it white, and for canning it is preferred white. In former years the tips were used. Deep planting and high cultivation has resulted in a great part of the stem being used, thus avoiding waste.

Beans. The green sorts of the bush, commonly known as snapshorts, have been greatly improved. The round podded sorts are used almost altogether for summer, being stringless, prolific, bear for a long period without becoming overripe, while the old flat-podded sorts from which the new round-podded sorts have sprung are used for early bearing only, as they become tough and stringy very soon after starting into bearing, and yet it has been discovered within recent years that these old varieties of flat-podded types are excellent for forcing under glass, the American varieties being far superior to many of the imported sorts used for forcing only. In the wax varieties the same advancements have been made; while quality and productiveness is sought it is often at the loss of the bean grower because of the lessening of the quantity of the bean seed. In the pole varieties like advancements have been made in green and wax sorts, not only in enormously productive quality, but in pods of large size.

The Lima bean has been very much improved from the long-podded thick skin sorts, with white flat beans and three or four to the pod, to the thin-shelled, closely set with plump green beans from four to six in the pod is counted a boon to the commercial gardener and home grower, increasing from four quarts of shelled beans to seven from a five-eighth bushel basket of pods. They are also improved in flavor and are a luxury for the table and more profitable to the market gardener. Here exact types have been also developed, having now the large flat Lima or Improved Lima in dwarf plants. These number about six varieties.

Beets. In table sorts we notice the new good varieties are produced by crossing the best of the deep blood with white, thus giving color and sweetness combined, also earliness with small top, making good forcing varieties. While these are not so desirable for

summer sowing as the deep blood sorts with heavier tops, it is imperative to produce a tender, deep color, turnip-shaped beet during hot weather.

Cabbage. The improvements are not numerous but of great value, particularly in early sorts which have been crossed with larger types, thus giving large crops very early in summer. In the later sorts large headed and long keeping varieties have been added.

Celery. While the popular sorts of England are the red and giant varieties, our taste has been toward dwarf and easily blanching white and yellow varieties, the reds being seldom used, this being the most important crop of the market gardener, the one which he calls his wage payer, is treated with the utmost care, the new sorts being mostly in dwarf early types possessing good keeping qualities. Consumers will observe that much of the early celery is not tender and brittle nor even sweet. This is because the largest quantity of the early product is grown in the northwest during the early summer and blanched without banking with soil; is thrust upon the early market. This method never produces tender, sweet celery. It must be banked with soil and allowed to grow into bleaching; hence the home-grown product is much the best.

Corn. In this class early crossing is permitted, thus requiring close selection. The introductions have been mainly in the zig zag varieties with large ears and deep grain, thus maintaining sweetness and tenderness up to maturity small cob sorts being an object. The new introductions in the extra early sorts have entirely eliminated the early flint varieties. Growers are hard at work trying to improve zig zag character with the early varieties. In the last four years several yellow sorts have been introduced as extra early, which are very good sorts, quite sweet, but small ears.

Cucumbers. A few introductions which are very good, the object being to maintain the green color during summer. The forcing varieties are more numerous in the new introductions.

Endive. A much used salad by the chefs. The curled sorts with broad white rib are in greatest demand. They must be thoroughly bleached.

Lettuce. This is one of the most fickle of vegetables in popular fancy. Different types are popular in different parts of the country, some markets can sell sorts which would find no sale in cities only a few miles distant, but the new sorts are the heading, heat-resisting in both crinkled leaf and plain leaf varieties. European introductions rarely become staple. American new sorts are much better and without the strong, bitter taste.

Musk Melons. Like all cucurbitacea is so susceptible of producing numerous varieties, many new sorts are introduced in both orange fleshed and green fleshed, the former requiring heavy soil to produce them in good quality, while many new sorts are listed and are new in character and quality, yet only a few become staple. Location has much to do with the production of good quality. The same is true of water melons, yet the hard, thin rind with crimson flesh of fine grain is the kind sought after.

Onions. All the new sorts introduced have been of the quick-growing and full maturing from seed the first year. These rarely have keeping qualities. The old sorts known for the last half century are still in cultivation and supply the winter keeping onion.

Peas. Improvements of value have been made along this line and much appreciated by all who use this much prized vegetable. Within a few years the large green wrinkled sorts have been brought to perfection in tall and dwarf varieties, and maturing in three days after the early round seeded sorts. Other varieties have been introduced which endure our hot summers, thus giving green peas a large part of the growing season. The sugar or edible pod sorts are of excellent quality and have been greatly improved. These are used pod and grain.

Parsley. A very few introductions, but they have been of value. Within the last decade a few sorts have come to the front with qualities needed in this extensively grown vegetable, viz, moss curled dark green, and retaining the dark green color through the season.

Pepper. From the heavily seeded hot fruit, the large thick-fleshed kinds are valuable acquisitions. These with the cluster sorts and the small pickles play an important part in making up the 57 varieties now known to the world at large.

Radish. Of these we have new introductions nearly every season, with slight variation in color, yet the bright red button sorts with the white have been and are valuable to the commercial grower, being quick in maturing and readily forced.

Rhubarb. This vegetable so much grown in this country is a foliage plant in Europe. The improvement is from the dull green to the bright red; also in much thicker stems. Rhubarb has become a very important commercial vegetable and is readily forced.

Squash. These with pumpkins have played an important part in new introductions. There also preferences, the red and yellow in the north and the lighter colors in the south. The most distinct introductions have been those in bush form.

Tomato. This valuable vegetable, which even at this day is used in Europe as an ornamental plant, is coming into use gradually as a staple vegetable. With us its use has demanded the greatest improvements. From the flat, irregular varieties, which were the only early sorts a few years ago, we now have perfect, round, well colored sorts of excellent quality. They are also in tree form of uniform fruit. The forcing sorts are distinct and excellent in quality. The latest introductions are these tree-shaped with large dark red and pink fruit.

Some of our well-known vegetables have been omitted in this list, but the improvement not having been marked in the last decade, they have not been mentioned, having touched on types and not varieties, leaves this subject with you in a somewhat unfinished state, but the seed catalogues of the leading reliable firms have the newer types and varieties listed with full description of their merits.

While all new things may not do well, yet they are worthy of trial, and those that do fill their described qualities do so because they have met the conditions suited to them. This is not only true of vegetables, but is especially true in the cultivation of fruits and flowers.

Mr. Thilow followed up this address with a number of charts illustrating the various types of vegetables, showing the evolution from the primitive sorts to the improved varieties of the present day.

Evening Session, December 12.

Wednesday evening the convention was entertained by Mr. Thilow who delivered a finely illustrated lecture on the "Beauties of the Yellowstone," being an account of a personal trip through that marvelous national park. Mr. Thilow carried his audience with him on a coaching trip through valleys, over mountains, seeing the wonderfully bright skies, the mighty geysers and wonderful rock formations. So realistic did the lecturer make the trip that his hearers could say, "We have been to the Yellowstone." Mr. Thilow was delightfully assisted by Miss Susan Peters, of Mount Holly Springs, who preceded and followed him with vocal selections.

Thursday Morning, December 13.

The session of Thursday morning was opened by D. Gold Miller, of Miller Brothers, owners of the famous "Miller Orchards," in Berkley county, W. Va., Mr. Miller's subject being

PROFITABLE COMMERCIAL ORCHARDS.

My dear horticultural friends of Adams county: Although this is only the second time I have had the pleasure of meeting with you, I have been so kindly and so hospitably entertained by you, that I feel like I have known you all my life.

I have for by subject profitable commercial orchards. My dear friends, everybody ought to be honest, but the man who addresses a horticultural meeting should be doubly so, as fruit growers are differently situated from other men. For instance, if a farmer sells his neighbor seed corn or seed potatoes, or seed wheat, in less than a year his neighbor knows whether or not the seed is what it was recommended to be; but a fruit grower must plant his trees and wait five, ten or even fifteen years before he can find out whether he has been defrauded or not, and if I should by false statements or from a vain desire to make a show before this audience, lead others to engage in a business that after years of patient toil and waiting should be fraught with disaster, my place should be in the state prison behind the bars.

Now, while I will give you some sales of both apples and peaches which are simply astounding, in some instances reaching the colossal figures of over $1,000 per acre for a single crop, I feel honor bound to give you on the other hand the history of other orchards in our locality that have lived and died without ever paying expenses. Now for fear you will find fault with me for bragging or boasting, I will refer you to Mr. Collingwood, to whom all delight so to listen. You remember what he said to us in his speech at Inwood. He said you people down here in West Virginia and Pennsylvania don't "blow your own horn enough." He said you have the best land, the best climate, the best stock, the best grain, the best fruit, and the best people in the world, and you stay at home and say nothing about it.

Why, said he, if we "Yankees" had half as much, we would have a hundred men on the road telling people about it.

Most of you have heard of my father, the late W. S. Miller, who spent over fifty years of his life in developing both the theoretical and practical side of horticulture, way back there in the fifties. One balmy spring day my father was engaged in planting an orchard when a neighbor, a wealthy "slave trader" and "paper shaver," who was riding along the road with a friend, said to his friend loud enough so it was heard by the men helping to plant the trees, "I feel sorry for William Miller; he is a splendid man, but he is losing his mind, he is growing crazy. He has taken the very best grain field on his farm and dug it full of ugly holes and is planting the whole field in apples and peaches, he is certainly going crazy." But, my dear friends, my father, instead of going to the insane asylum, lived to see that orchard produce money enough to buy and sell that old "slave trader" and "paper shaver." There is in our neighborhood an orchard which I desire to call your attention to. This orchard is known as the home orchard of my brother, John M. Miller. I tried to get at his diary so as to give you correct statements of his annual sales from this orchard, but my brother is not afflicted like I am. If I know anything good I can't rest until I tell all my friends about it, but if he knows something good he believes in letting other people find it out the best way they can, but suffice to say that he started when he was 21 years of age with only money enough to buy 35 acres of Apple Pie Ridge land at $17 an acre. He planted the entire field in Ben Davis and York Imperial apples; he has had no other resource for making money, and no other business than caring for this orchard; he now owns over 600 acres of Ben Davis and York Imperial apple orchards and is rated as being worth from $150,000 to $200,000. The crop on this 35 acres of 30 years old trees in 1905 amounted to 8,000 barrels and sold for $1.80 per barrel. In my father's orchard, the season of 1901, some of the best acres with 35 trees to the acre, averaged ten barrels to the tree or 350 barrels to the acre, which sold for the fabulous price of $3.26 a barrel, making a gross sale of $1,141 for a single crop from a single acre. In the same orchard we had one Grimes Golden tree 34 years old which had 23 barrels of apples on it, besides several barrels on the ground. Before leaving the apple I must tell you of an orchard near my old home which is nearly 40 years old and is now being cut out, as most of the trees are either dead or so badly on the decline as to be worthless. Although this orchard occupied a splendid piece of ground, it has never paid for the work and expense put upon it. In the first place the owner was not an orchard man. One great mistake was the planting of too many varieties, ripening at different times, rendering it impossible to make good sales; another reason for the failure is this orchard was frequently used for a pasture field and in general treated like an ordinary grain field. It received little or no pruning and absolutely no spraying. He didn't have a Niagara Gas Sprayer. We have in our county seat men who are living in town and own land in the country, who are planting large orchards, expecting to grow apples and peaches by telephone. I do not see how they can make a success of growing fruit in this way. Those of us who spend almost the 365 days of each year with our trees sometimes become discouraged and feel that we are not equal

to the task. We naturally ask the question, how can these inexperienced men who are depending on hired hands with still less experience succeed? Time only will answer this question. But I predict some disappointment for these city fruit growers, although some fine orchards are owned and operated by men living in cities.

In my opinion growing peaches should be entirely separate and apart from growing apples. The practice of planting three peach trees to one apple tree on the same ground is a woeful mistake. In the first place, I believe that taking the first twenty years of the life of an apple orchard with peach trees planted between, that every dollar that is made on the peaches is lost on the apples. A twenty-year apple tree that has never been shaded and crowded by a peach tree will be nearly as large again as one that has been grown among peach trees. And I firmly believe that "San José scale" increases twice as fast on a peach tree as on an apple tree, and as there are three times as many trees on the same ground where peach is planted between, the scale can travel very much faster than where only apple is planted.

To purchase old land on the mountains and plant and care for a peach orchard until it reaches the fourth year or bearing age costs about $60 per acre. To clear new land and plant in peaches and care for them until they reach a bearing age costs about $80 an acre. We have gotten all the way from nothing up to $400 an acre for a single crop of peaches. I should discourage planting peaches out in the valleys, as the land is too valuable and is in no way equal to the mountain land for growing peaches.

Our experience shows us the folly of trying to raise peaches on valley land in competition with mountain peaches. In the last 14 years we have had eleven paying crops of peaches on the mountains while in the valleys we have had only three full crops with several pieces of crops in the same length of time. Nor is this all of the advantage the mountain peach growers have. The mountain peaches are better colored, better flavored and keep better than those grown in the valleys, and the trees also live longer.

Probably there are some present at this meeting who are not professional fruit growers, or exclusive fruit growers, but would like to grow an orchard as a side issue to some other business. To all such I would say, go ahead. We have many farmers who have been raising corn and wheat all their lives and have never had a cent of cash money they could call their own, and now that they have a small apple orchard of five or ten acres in full bearing, every two years they have some clear money and are getting out of debt. But in spite of the fact that the little apple orchard is paying more clear money than all the rest of the farm put together, it is difficult to get them to give up the corn and wheat and treat the little orchard as it should be treated.

DISCUSSION.

Answered by Mr. Miller.

Q. Do you follow out that idea of a few kinds in a peach orchard?

A. No, we have to use rotation. We plant in blocks usually from 100 to 500 of a variety so as to keep up the rotation throughout the season. That will not hold good in peaches. If you have only a few varieties of peaches the season soon ends.

Q. You do not favor very early peaches. Do you have any ripen before the middle of August?

A. Yes, we use the Southern Early and the Carmen, largely on mountains, but in the valley I would not recommend anything ripening before the Elberta, which ripens about the first of August. We have not been able to do anything for the last five or ten years but sell them in small quantities. We can use extra varieties, but later we sell nothing off the mountain until the Elberta season, about the 25th of August. The Elberta is classed with the Ben Davis. It is the best peach of all to market, but is not very good to eat.

Q. What distance apart do you plant apple trees?

A. Usually we plant 32 feet, but that is too close. Orchards planted 32 feet, limbs meet and cannot get through with a wagon; 36 to 40 feet is better and I prefer 40 feet for York Imperial apples.

Q. What do you think of 35 feet?

A. Does not allow a four-horse team to go through. The big spray machines have trouble in driving between the trees. We have to trim the intervening branches.

Q. Will heading trees 8 to 15 inches free of limbs on the ground be crowding too much?

A. Two and a half feet is low enough to head York Imperials.

Q. Is 4 feet too high?

A. Yes; 2½ to 3 feet is about right.

Q. Do you head in your peach trees?

A. We always cut out. I believe in separate pruning for every peach tree. I do not think it is well to cut apple trees after they are four years old.

MR. BENDER: Brother, I have two orchards, 90 acres in the two. We trim all trees; 4 feet is plenty low enough. When there is a full crop it will bend down the limbs and there will be green apples underneath.

Q. Would spraying peach trees endanger foliage?

A. Four pounds bluestone and 4 pounds lime to 50 gallons of water would injure the foliage; lime and sulphur would do the same. There is, however, a weaker solution of Bordeaux that they use on the foliage, about half the strength of the bluestone and nearly double of lime—2½ bluestone and 8 lime to 50 gallons water—can be put on with safety when the tree is dormant; but if full strength Bordeaux is used just before the buds open in spring that would be all that is necessary for any vigorous disease on the peach tree.

Q. At what age do you begin to cultivate apples?

A. I never have killed a tree by plowing it.

Q. How about plowing when the limbs meet?

A. We still scratch the best way we can. The roots reach out as far as the branches; it is the roots that are feeders. We try to keep the roots moving.

FUNGUS DISEASES OF ORCHARD FRUITS.

By DR. C. L. SHEAR. In charge of Orchard Diseases, U. S. Dept. of Agriculture.

Mr. President, Ladies and Gentlemen: I greatly regret Prof. Waite's inability to be here instead of myself, but it was impracticable for him to come on account of his work in California. If you will bear with me under the circumstances, which seem unavoidable, I will try to speak to you on the subject of fungous diseases of the orchard and not on those caused by insects.

The subject of fungous diseases alone is a very extensive one and cannot be adequately dealth with in the time at my disposal. It may be desirable by way of introduction to make some general remarks on fungi and their nature. Most of you have some idea of the term "fungi" and what it is applied to, although it may be indefinite. This is quite natural, as the greater part of these organisms are microscopic and do not usually attract attention. The conspicuous fungi, such as mushrooms and toadstools, are mostly of very little importance in connection with fruit diseases. Other kinds of fungi, such as the parasitic forms which attack living plants, are usually microscopic. The ordinary blue-mold may be taken as an example of the minute fungi with which most people are familiar. This fungus will usually develop upon any dead vegetable matter which is kept in a warm moist place. The powdery dust that flies through the air when the fungus is disturbed consists of the spores or reproductive bodies of the plants. These are very minute and cannot be seen individually except by the aid of a miscroscope. In nearly all of our operations for preventing and controlling plant diseases we have to contend with similar spores or minute reproductive bodies.

Fungi are sometimes classified according to their mode of living. Those, like most of the mushrooms and toadstools, which grow only upon dead matter, are technically called saprophytes. There is another class of fungi that largely grows upon living plants, but only under conditions that are very unfavorable to the plants, or when they have been injured in some way; these are sometimes called facultative parasites. Under certain conditions the blue-mold, though a saprophyte, causes considerable damage to ripe fruit which has been injured, but this class of organisms does not attack living plants. The fungi which are most injurious to living plants are known as true or active parasites. By an active parasite we mean one whose spores or germs occurring upon the unbroken surface of the living plant under favorable conditions, will grow and penetrate the tissues of the plant, causing the death and decay of the part attacked. There are certain facts of this nature which it seems to us desirable for all who are combating plant diseases to be familiar

with, and unless the fundamental principles upon which our practice in combating these diseases are understood, it is difficult for us to carry on the work successfully. The person who performs an operation the nature and principles of which he does not understand, is much less apt to be successful than the person who fully understands the reasons for the different steps of the operation. The truth of this is frequently illustrated in our spraying work. People prepare and apply Bordeaux mixture and other fungicides without knowing the reason or importance of the different steps which they are directed to take, frequently neglect some essential step upon which the success may depend.

Our present methods of combating fungous diseases are mostly preventive. After the germs of a disease have once entered the plant they are practically out of the reach of fungicides or any external applications that may be made. Hence our treatment consists chiefly in endeavoring to keep these organisms from gaining entrance to the plant. To accomplish this we try to entirely cover the surface of the plant with some preparation that will kill any parasitic germ that may be present at the time or that may be borne there later by the wind or water. Since it is practically impossible to cover completely all the surfaces of the stems, leaves and fruit of a plant, the best we can do is to approximate it as nearly as possible. We shall have more to say later in regard to the details of spraying. It may be best for us now to take up in their order, briefly, the principal diseases of the orchard. We may begin with those of the peach, plum and cherry. As we understand that you are most interested in this region in the growing of apples, we shall endeavor to devote special attention to their diseases.

Diseases of the Peach. The most destructive fungus diseases of the peach are brown-rot and leaf curl. There are several other important diseases which are not of a fungous nature; these are peach yellows, peach rosette and little peach. Neither of the two last named diseases is known to occur in this region. The other disease, peach yellows, is very likely to occur here, as it is found both north and south of you. The yellows is a peculiar disease, the nature of which is not entirely understood at present. A great deal of study has been given to the subject, but thus far its exact nature has not been determined. We know, however that it is contagious, and that once getting into an orchard it spreads from tree to tree until all are destroyed. Trees which are affected produce a yellowish foliage and tufts of slender ,abnormal branches, while the fruit is imperfectly developed and the flesh is streaked with red. The only known means of controlling this disease is to destroy all affected trees by burning as soon as the disease appears. By carefully watching an orchard and taking out all diseased trees as soon as observed its spread may be prevented. This method has been carried out successfully in several places.

Of the two fungous diseases mentioned brown-rot is usually the most serious. This, I think, is the disease to which Mr. Miller referred in his remarks this morning. It has been unusually severe during the past season on account of the climatic conditions being especially favorable for its development. Excessive heat and moisture are important factors in the development and spread of this disease, as they are in the case of most fungous diseases. Brown-

rot, I am sorry to say, is one of the fungous diseases most difficult to satisfactorily control. This is due, in part, to the fact that peach foliage is very susceptible to injury by fungicides, and when a solution of sufficient strength to destroy the fungous spores is used it is apt to cause defoliation of the trees. The amount of disease is frequently reduced sufficiently to justify the spraying, but the results are not all that could be wished. The first application should be a very thorough one, made just before the buds begin to open. At that time a Bordeaux mixture consisting of 6 pounds of bluestone, 4 pounds lime and 50 gallons of water can be used without injury to the trees, but after the foliage appears it cannot be safely used in greater strength than 3 pounds bluestone, 6 to 9 pounds lime, and the same quantity of water; even this strength will sometimes injure the foliage. The second application should be made when the fruit is well set, and two more at intervals of ten days to two weeks.

The brown-rot also frequently attacks the plum and cherry, and is very injurious to both these fruits. The trees should be treated the same as the peach. The foliage of these, however, is more hardy than that of the peach and is, therefore, less liable to injury. There are other minor diseases of these trees, but we shall hardly have time to mention them all. If there are any questions in regard to diseases not mentioned we shall be glad to try to answer them later.

Diseases of the Pear. One of the most serious diseases of the pear, the blight, is not a fungous disease strictly speaking, but of bacterial origin. Pear blight, or fireblight, as it is sometimes called, attacks not only the pear, but the apple and quince and occasionally some of the other fruits. It generally affects the pear most seriously. As already said, this is a bacterial disease and one that cannot be reached by external applications, as the germs enter the tree chiefly by way of the flowers, where they are carried by bees and other insects. Trunk blight or body blight is a form of this disease in which the germs gain entrance to the trunk or branches of the trees and destroy the growing tissues. This form of the blight is more serious than that which affects the flowers and twigs, as it may frequently kill the tree and also live over the winter, thus forming a source of contagion in the spring. The sap, containing innumerable blight germs, sometimes bursts through the bark of diseased spots in the spring and the disease is spread by insects which visit this somewhat sweet exudate and becoming contaminated with the germs carry them from flower to flower where they immediately proceed to multiply in great numbers and pass down the twigs and into the branches. As the germs gain entrance chiefly through the flowers and develop and spread beneath the bark, you will readily see why we are unable to reach them by means of spraying. The only practical means we have of combating this disease is to cut and destroy all the affected parts. This method is successful if carried out thoroughly and carefully. The blight may be cut out and burned as soon as its appearance is detected in a twig, but in cutting it during the growing season great care must be taken to cut below the point that any of the germs may have reached. You will perhaps first notice a small dead twig with blackened leaves on it. On examining it closely you will see that the bark appears dark colored and dead, following down the twig or branch you finally reach a point where the surface of the bark looks healthy and you may think this

is the end of the diseased portion. Unfortunately this is not true. The germs are frequently busily growing and working downward beneath the bark, though it does not yet become discolored. It is, therefore, necessary in removing dead branches, especially during the growing season, to cut 12 inches or more below the point where the bark has become brown. Otherwise your work will have been worse than useless. Another precaution that must be taken at all times is to sterilize all tools used. Whenever a diseased branch is removed, the knife, ax or saw becomes contaminated with the germs of the disease and may transmit them to the next branch that you remove. The most convenient and effective antiseptic for this purpose is corrosive sublimate. Carbolic acid is effective, but is less convenient and more dangerous to handle. The corrosive sublimate can be purchased very cheaply in the forrm of tablets which can be used in a solution of 1 part to 1,000 of water and applied to the tools with a sponge. It is also necessary, in order to thoroughly control this disease, that there should be united effort on the part of every person growing pears in a community, as a single diseased tree in some back yard, if not attended to, may be a source of danger to all pear trees in the region.

The fungous diseases of the pear, such as scab and leaf-spot, can be very successfully controlled by the application of Bordeaux mixture, following the directions that will be given in connection with apple diseases.

Diseases of the Apple. The disease which we understand to be most injurious here is the scab. The bitter-rot you probably have but little trouble with. This disease is most injurious in Virginia and further south, as well as westward in Missouri and the neighboring regions.

Scab, as well as black-rot, sooty-blotch, fly speck, leaf-spot and most other diseases affecting the leaves or fruit, can be very successfully controlled by the proper use of Bordeaux mixture. Where the scab is prevalent the first spraying should be done as soon as the clusters of blossom buds are exposed and before the flowers open. The second application should be made just after the blossoms fall; a third about ten days later, and the fourth and fifth at intervals of about two weeks. The dates of the application can be so arranged that by adding your poison for the codling moth to the Bordeaux mixture a separate treatment for this pest can be avoided. There is no longer any doubt about the success of this method of preventing the fungous diseases of the apple that we have mentioned. When failure occurs it can almost always be traced to some error in the preparation of application of the mixture.

We shall show you a little later lantern slides from photographs illustrating the remarkable results obtained by Prof. W. M. Scott, of the Department of Agriculture, in preventing the leafspot, bitter-rot and fruit-blotch in Virgina and Missouri. The apple leaf-spot or "frog-eye," as it is sometimes called, which is quite prevalent in this region, is a more serious trouble than many persons suppose. Anything which destroys a considerable portion of the leaf tissue or causes the leaves to fall before they are matured, as the leaf-spot fungus does, will necessarily interfere with the full development and maturing of the fruit, as the leaves are organs which perform a very important part in supplying nutriment for the growth and maturing of the fruit. The fungi which produce leaf spots are also frequently

transmitted to the fruit and produce a direct injury to it. Leaf spot can be very effectively controlled by the use of Bordeaux mixture.

Spraying Apparatus. In order to spray successfully one must have a good outfit adapted to the purpose for which it is to be used. A poor machine equipped with poor nozzles is frequently the cause of failure. Sufficient power is a primary requisite in the production of a satisfactory spray. Power may be obtained in several ways, the simplest form is that of a hand pump, but this is not satisfactory for general orchard work. The other means of obtaining power are: horses, gas, compressed air and steam or gasoline engines. Geared machines in which the power is supplied by horses must be kept moving in order to keep up the necessary pressure, and are, on that account, not adapted to successful orchard work. Gas furnishes excellent power, is very convenient to use, and there is no pump to get out of order. It is usually, however, considered more expensive than steam or gasoline power, and unless one is so situated that the drums can be recharged promptly serious delays are likely to occur which may interfere with the success of the work.

Compressed air is used in the same manner as gas, the air being compressed by means of an air-pump run by an engine. This form of power is also usually considered somewhat more expensive than that derived directly from an engine.

Both steam and gasoline engines are in use. The steam outfits are usually heavier than those which use gasoline. A two or three horse-power gasoline engine will furnish an abundance of power for spraying purposes and is also of great general usefulness about a farm. Such an engine, combined with a good pump, made especially for applying fungicides, does very satisfactory work. Where engine and pump are made and fitted for spraying purposes by the same manufacturer there is usually less liability to delay and loss from breakage and repairs.

Having your power and pump, the next important part of the outfit is the spray nozzle. In order to properly cover the foliage and fruit a very fine spray must be produced, and this cannot be done without a good nozzle. A good nozzle is one that will produce a fine spray with a minimum amount of pressure.

Those of the Vermorel type, if properly made, are very satisfactory. We regret to say, however, that most of the nozzles on the market are not made with sufficient care nor from the best materials. You may be sure there is something wrong with a nozzle that requires more than 75 pounds pressure to produce a fine spray. If perfectly made a less pressure should be sufficient. For further information in regard to spraying apparatus, as well as fungicides, you should consult Prof. Waite's Farmer's Bulletin No. 243, which will be gladly supplied to anybody for the asking. Simply address Department of Agriculture, Washington, D. C.

Bordeaux Mixture. Having the necessary apparatus, the next thing is the preparation of the mixture. Bordeaux mixture is the best fungicide for general purposes yet discovered. In order to give good results it must be carefully prepared from good material. Copper sulphate and lime are the necessary ingredients. The ordinary commercial copper sulphate or bluestone is usually satisfactory. The lime used should be good, fresh stone line. The various brands of ground lime are generally less satisfactory. Bordeaux mixture is a complex chemical compound, and cannot be properly made without

carefully following the directions. The copper sulphate should be completely dissolved in about half the quantity of water that is desired in the complete mixture. The lime should be slaked and also diluted to about the same extent. If 50 gallons of the mixture is being made, the 5 pounds of copper sulphate should be diluted to at least 20 gallons and the 5 pounds of lime should be diluted in the same degree. The lime water and the copper sulphate solution should now be poured together or allowed to run together at the same time into a spray tank and thoroughly stirred. It is only when the two ingredients are mixed together in a very dilute condition that the copper hydroxide, which is the most important part of the mixture is formed. For this reason all prepared Bordeaux mixtures which are in the form of a paste should be avoided. Time will not permit the discussion of other details, such as the various arrangements for facilitating the handling and mixing of the materials. You should consult the bulletin mentioned for further information in regard to these matters.

Having the necessary power, pump, nozzles and mixture, there is still a possibility of failure unless they are handled by competent persons who can be relied upon to do the work thoroughly. We have dwelt upon this matter of spraying because we consider it an exceedingly important one. We find in our work that in the great majority of cases where people attempt spraying and do not get satisfactory results, they have either not properly prepared or properly applied the mixture.

The address was followed by the exhibition of a series of lantern slides illustrating the various diseases discussed and showing the methods followed and the results obtained in combating them.

DISCUSSION.

By DR. SHEAR.

Consisting of Questions and Answers.

Q. Is it not now considered that salt is unnecessary in the lime-sulphur-salt mixture?

A. Yes, it can be dispensed with, its chief usefulness is said to be that of increasing the adhesive qualities of the mixture.

Q. If rotten apples remain on the tree at the end of the season will they spread disease?

A. They are, no doubt a source of infestation, but whether sufficient benefit would result to justify the expense of picking and destroying them is doubtful.

Q. Will they damage the soil if allowed to remain on the ground?

A. I do not know whether they do any real damage to the soil or not; they might, perhaps, if they were present in very large numbers.

Q. How many uses has the lime-sulphur-salt outside of San José scale?

A. It is also a fungicide, but can only be used when the trees are in a dormant condition, and hence very few fungous diseases can be treated with it.

Q. Will the Bordeaux mixture prevent leaf-curl?

A. It will undoubtedly if properly prepared and applied.

Q. (Mr. Miller:) We had some orchards that were badly infected with the leaf-curl, and the next year the first spraying I did was with lime-sulphur-salt, and there was no leaf-curl that year. I thought then that I had the right remedy. The next year I sprayed early, but found that there were several trees badly curled. Then I thought that I did not have it.

A. There is no doubt but that the lime-sulphur-salt has a fungicidal effect, but it is not quite as satisfactory as Bordeaux mixture. It may be improved by the addition of copper sulphate.

Q. What strength of Bordeaux mixture would you recommend for plum blight

A. Ordinarily 3 pounds bluestone to 6 or 8 pounds lime and 50 gallons of water.

Q. What form of lime do you recommend?

A. Fresh stone lime. Some people use ground lime with very satisfactory results, but there are times when the results are not satisfactory, as the quality of such lime is not always good, and there are certain brands of it that contain as high as 30 per cent. of magnesia. This is all waste matter and helps to clog your machine.

Q. Is there danger of getting too much lime in the Bordeaux?

A. No danger except that any great excess of lime you use may tend to clog the nozzles. The only quantity necessary is sufficient to neutralize the copper.

Q. How about caustic soda?

A. Caustic soda when mixed with bluestone is a very good fungicide.

Q. What proportions?

A. Soda-Bordeaux, as this mixture is called, consists of 5 or 6 pounds copper sulphate to 2 pounds caustic soda in 50 gallons of water.

Q. Do you recommend arsenate of lead?

A. You mean as an insicticide in preference to Paris green? I think arsenate of lead has been found most satisfactory.

Q. What is the principal objection to Paris green?

A. It does not adhere as well as arsenate of lead and there is more danger of injury to the foliage.

Q. Is not the claim that lime and sulphur is a preventive of leaf-curl due rather to favorable weather conditions that have perhaps prevented leaf-curl from appearing? Now there are some seasons when there is absolutely no leaf-curl, and yet the orchards that have been sprayed with lime-sulphur have the credit of being cured by that application. Sometimes people are misled. In dry seasons leaf-curl does not appear.

A. Experiments in California have shown conclusively that lime-sulphur-salt is a very efficient remedy for peach leaf-curl, but not quite so satisfactory as Bordeaux mixture or lime-sulphur-salt, to which copper sulphate has been added.

MR. MILLER: Lime-sulphur spraying does not prevent bitter-rot on apples. I have tried that to my satisfaction. We sprayed one of our orchards in the spring and it was destroyed by bitter-rot befoe the coming summer.

Q. Is there a remedy for canker?

A. If canker once forms you cannot cure by application of fungicides, but they will prevent the formation of new canker. I sent some specimens to Prof. Surface and he said the only thing to do was to cut the tree down.

PROF. SURFACE: If canker were restricted to certain branches, it would only be necessary to cut away these branches.

MR. POWELL: I find great benefit from beginning spraying at the top of the tree and spraying clear to the ground. It is equally important to spray the bodies of the trees as it is the foliage. Begin each year and spray from the time they are planted. By keeping the body clean and protected from fungus troubles you will keep them from extending to the branches.

MR. ELDON: I do not know how far off the mark I am, but for three seasons have never attempted to spray with anything but lime, sulphur and salt—last year with lime and sulphur only. It seems to me in this condition that one of the strongest points is that you can put it on without any danger of injury to the tree. I have an apple tree or two that look now as if they have been sprayed within a week or two; the bark is perfectly clean. It seems to me that oils cannot be applied without injury to the tree.

MR. POWELL: I am using some of the oil preparations. When we are spraying the tops of our trees—using "Scalecide" for San José scale—we are as particular to spray the bodies as we are in using Bordeaux mixture, and we are getting very nice, clean, smooth condition of bark. Spraying last year trees that were nine years old having good sized bodies and which were thoroughly encrusted, we find that they are cleaned up; the bodies look fine, bright in color, clean and smooth. We have only had one year's experience in spraying the bodies of trees with "Scalecide." The first year was very satisfactory in this respect. There may be no fungicidal effect with this spray, but the clean, new, smooth bark that is produced is healthful in making trees resistant to disease. It puts the bark in condition to resist disease. I am certainly pleased with it so far.

MR. MILLER: The President seems to swear by lime and sulphur. How long has anybody in this house been using the oil preparations? The only thing we fear with the oil is that after long use it will damage the tree. In one or two instances we noticed the bark had cracked after using the spray with oil. Would like to hear from somebody who has used it 3, 4 or 5 years. I have only used it one year, but we had the cleanest inside growth on our trees last year that we ever had. The scale had not been on the trees long.

A Member: No one can answer Mr. Miller's question so far as soluble oil is concerned, because it has not been on the market that long. But crude oil has been used longer than that. Will be glad to hear from Mr. Prickett, who has used crude oil for many years.

MR. PRICKETT: I simply want to corroborate. I was probably one of the first to get scale in this locality. Began by using crude oil about 10 years ago and with the exception of one season have used it continuously. Trees look very well; bark healthy. Bore

good crop of apples last fall. I have been using Target Brand last year.

DR. LONGSDORF: I have never sprayed with anything but "Scalecide." My experience has been limited within last two years. Last year applied it to 400 apple trees 9 years old. I sprayed 500 trees last October with "Scalecide," 5 gallons to the 100. These trees made a remarkable growth. I believe I had the best results because I did some of this spraying myself. One of these trees in about 500 died, and they were awfully infested. I believe I sprayed them in March and again two weeks ago. That makes three sprayings with "Scalecide," and I think from my knowledge of chemistry and my experience with "Scalecide," that the thin coating of paraffin over the bark increases the resistant power, because my trees look perfectly healthy and are certainly in a very healthy condition. I believe I had the best results when I used 6 gallons of "Scalecide" to 100 of water. I sprayed my whole orchard last spring; 6 gallons of "Scalecide" to 100 of water, instead of 5. I have some trees that I am going to spray next week. Am going to use 8 gallons of "Scalecide." When the tree is dormant and if the "Scalecide" dies not settle to the bottom of your sprayer it probably would not be injured by 10 per cent. But that is a matter for experiment and experience. But if I had to depend on spraying with lime, sulphur and salt I would pull trees up. No man's result could be better than mine; the trees were as bad as trees could be, and the results could not be any better with any material than my results have been.

MR. MILLER: I have used that preparation—6 gallons to 100. Killed scale. That was what we wanted.

MR. ELDON: Lime and sulphur is the salvation of the peach tree, but very troublesome.

MR. WHITE: I do not think, as mentioned here, the labor of putting on the lime, sulphur and salt has been fully brought out. It is the hardest work in the world to keep our help through the season of spraying. Our men get sore before they get through. Have never used "Scalecide." Have used crude petroleum.

MR. ELDON. Mr. White touches the point. The boss has got to go into it. No matter how good and valuable the help is, spraying is a job that cannot be done without supervision.

MR. POWELL: The whole secret of success with whatever we use, whether "Scalecide" or something else, is to be particular. I had occasion to stay out in my own orchard two years ago while about 100 acres were sprayed. I spent the first day in the orchard myself holding the nozzle. We had some trees that were literally covered. Certain branches were incrusted all over and the fruit worthless. That was two years ago, and there is not a single scale on those trees now; there is not an evidence of a living scale where I held the nozzle myself. I said to my superintendent, "Now as we are going to start in to eradicate this thing positively, and I believe it can be done, you are to say to the men when they shall stop, not leave it to the men who are spraying." The superintendent must be in the field and give the word to stop, and no spraying must stop until he gives the word. Any orchard can be cleaned up, but it has to be done that way.

THURSDAY AFTERNOON.

"Propagation of Fruit Trees by Selection of Buds from Trees of Known Record of Production."

By GEO. T. POWELL, President "The Agricultural Experts Association", N. Y. City.

I need not say that it gives me great pleasure to meet with you today, for it reminds me of many exceedingly pleasant gatherings which I have met within your State a few years ago when attending your farmers' institutes, which were held very generally over the entire State. I am always interested in those who are directly engaged in the tilling of the soil because it represents so much of value to our country. When we work individually upon our farms, of more or less acres, we hardly realize what each farm in this country represents to its owner. When we gather together we find that we have nothing like a realization of the value of the accounts of agriculture. The present year's product of our farms is going to reach figures of wealth that are simply astounding, amounting fully to $7,000,000,000 in value. The present very general condition of prosperity among all classes is due to the great prosperity that exists with our agricultural interests.

Our railroads are taxed to the utmost to move the products of the soil, and I saw only a day or two since a direct statement that in one of your manufacturing towns here in Pennsylvania several hundred men were discharged from railroad repair shops for the reason that there was nothing for them to do, the cars being so constantly in use that they cannot be taken off for repairs. Several hundred men thrown out of employment from this cause—the most unusual condition I think that has ever been known. This is due to the very great prosperity of our agricultural and horticultural interests. Yet, I believe that we are but in our infancy as to the best results possible to be obtained from the cultivation of the soil. And for a short time this afternoon I shall be glad to take up some discussion along the lines of work which for a few years I have been following, getting some interesting results.

We have been accustomed to planting trees without any special reference to how they were produced. For instance, if a fruit grower wishes to purchase 100 or 500 trees, he sends in his order to a nurseryman for so many trees of certain varieties. The order is filled without question; the trees are planted with no knowledge whatever of the character of the stock; without any reference to any record or history of the material from which the stock has been propagated. For a number of years I have believed that this principle was not entirely right. If we are to solve many of the difficulties that are besetting us today, we should use more care in the selection of our stock and know more about its record in the matter of propagation.

In animal breeding we are past that; for many years we have declined to go on and give an order for fine cattle or horses without knowing something about their pedigree—without knowing something about the records of the parents in breeding. We plant 100 or 1,000 trees, without going back to find the record of the ancestry, and yet no one would think today of purchasing a finely bred horse, paying a good deal of money for it, unless he had some knowledge of the record back of it. People had not thought of this in regard to trees, and many of the woes and troubles that are upon us today are due simply to this. The demand has been so great for trees that nurserymen have taken their stock from any source from which they could get it, and usually have not gone outside of their nurseries to get their propagating wood, and have no idea of the character of the stock from which they are propagating. It is the tendency of nurserymen to propagate from trees that make the greatest growth. What is the result? In propagating thus you establish among your trees the vegetative principle. Such trees will stand for years, their characteristic property being to make growth and to give no evidence of production, until you get tired of waiting for it. I have known orchards to stand for fifteen years without giving any evidence of bearing, simply because the vegetative principle was propagated with the tree—and no other special quality.

Seventeen years ago while discussing this principle in the Nurserymen's Convention in Geneva, in my own State, I pointed out the value it would be to the nurseryman and to the fruit grower to take up the propagation of trees by the selection of buds from trees of known character. There was not a man in the convention that accepted my proposition. Every one was against me; thought it could not be done, that it was impracticable, and yet I went on from that point to make some demonstration of the principle.

People are today growing more particular about their food, and there is going to be a demand in the future for finer things, and the man who plants apple trees today will be wise if he recognizes this fact. For quality is going to be the demand in the future. Yet some of the most choice varieties are those which cannot be grown with profit. Hence they are not in general culture. I have been aiming to work out if possible some system by which we can take the most choice and delicate kinds and so work them upon other stocks that we may make them profitable to grow at fairly moderate prices.

Now let me take my first work, which was with the Tompkins County King. Most of you know that it represents very high quality and is in great demand. It sells in Europe today at the highest price of any apple shipped to European markets except the Newtown or Albemarle Pippin. The King is selling side by side with the Newtown and is growing in favor in foreign markets. Now while the King is an apple of exceedingly fine quality, and is high-priced, it is not a safe apple to plant commercially. Any practical fruit grower understands that if he were to put out 500 King apple trees, in ten or twelve years his orchard would be practically extinct. In a few years diseases would make their appearance, particularly one that is known as Apple Canker. The orchard goes down before it gets into bearing. Not even in New York State can you find any King orchards. They are planted here and there, but not commercially.

In former years, when I could spend more time at my farm, I discovered, in pruning, a difference in the different kinds of trees. I could prune Baldwins or Roxbury Russetts with comparative ease, but when I came to the Northern Spy trees I found that I could tire myself out in two hours, while I could prune other trees for half a day with ease and comfort. It set me to thinking why these Northern Spy trees should be so difficult and laborious to prune and other trees so easy. Then the thought came to me, why would not this hardy, firm stock represented by the Northern Spy be an admirable tree upon which to graft the Tompkins County King, and the more I thought of the proposition the more favorable it seemed to me. Finally I purchased a block of Northern Spy trees and set them in an orchard; then began to transfer King grafts upon them. When we came to selecting the King grafts, there arose the further question, "If there is this difference between the different varities, is there not a possibility of difference existing in the same variety?" And the more I thought upon that line the more it seemed possible to me.

You might breed 100 plants and get 100 distinct varieties. I do not breed for uniformity; there is no such thing as uniformity in breeding. There is a line of variation that asserts itself everywhere—in animals, plants, and in the human family. In a family of children you seldom see two alike. In a family of six children each one will have distinct characteristics that are so marked they are recognized. Now, this is just as true with trees as it is with animal life. And in studying upon these facts, the thought occurred to me that I had better look up the history of the Tompkins County King. After much search I found trees that had reached the age of thirty years, in perfect condition, strong, vigorous, healthy trees, producing uniform crops of fine fruit. In selecting scions, instead of taking them from any source that was nearby I sent a man to Western New York, and told him to go over miles of country until he found the tree I had in mind and had described to him. After traveling over a wide section, he found a King tree of thirty years of age which had borne as long as could be remembered, which was still strong, with the promise of thirty years more of growth and production. Scions were selected and carried over to my orchard from this tree with a history of thirty years.

Of this transfer something like 100 trees have been the result. I can say to you today that there has never been the first evidence of disease of any kind in this orchard of Tompkins County Kings. They began to produce five years after they were grafted; have steadily increased in bearing ever since and have borne several good paying crops. That is a record to start with that seems to me of very great significance. Only this past year the fruit from these trees averaged in the New York market $11.25 per bbl., simply because it represented something very excellent in quality. The flavor was so uniformly fine that it was recognized at once. (They were sold in open market at public auction.) Buyers came in, had a chance to examine the fruit, and bought it all at these prices. They were quick to recognize the superior quality of the fruit.

Now, I believe that this is only an indication of the future in planting trees and in growing fruit, with a value attached to it of which we at present have very little conception. I believe it is

going to be possible for us to take other varieties of choice, high-grade quality and transfer upon strong, vigorous stock, and with its influence upon the scion or bud we shall be able to grow varities that have heretofore been considered unprofitable to plant.

One word more upon this subject of variation. At the Columbian Exposition held in Chicago there was much difference of opinion among the judges of fruit coming from all parts of the United States and other countries. The judges found themselves in a great deal of disagreement on the question of varieties, and it was suggested that a referee be named to whom these questions of differences between judges should be referred. I happened to be the one chosen, and many cases were brought to me. I remember in one instance the judges could not decide on a matter of Greenings from Oregon. I went with the judges to the exhibit and looked them over. There were several different types of Rhode Island Greenings on exhibition, all marked Rhode Island Greenings. The variety was disputed by some of the judges. Yet when we came to apply the test to the Rhode Island Greenings by certain marks, they were found true to the name. Now the fact that expert judges found themselves differing was simply due to the law of variation which was asserting itself to the extent that expert judges did not recognize the variety in its different characteristics.

I remember judging fifty specimens of Rhode Island Greenings at an exhibition of the Connecticut Horticultural Society, and while it was a difficult matter to determine, the interest was so large that I said to the officers of the society: "Let the public in to see the method of judging. They may hinder me somewhat, but I would like them to see the process." In looking over 50 plates, I began to set them aside, a plate here and a plate there. In looking over again further elimination was made, and so the elimination kept going on, until finally it came down to the perfect standard for that variety of apple. Now, what made the difference? To those who never studied this phase of the subject it would seem impossible to go there and judge correctly fifty plates of the same variety, and yet when studying the question of variation in these apples it was an easy matter to eliminate until we came down to the recognized standard of the variety. It was due to the influence of the stock upon which the trees were budded or grafted which entered into the question of the wide variation in the fifty specimens.

Let us consider the manner in which I believe it is possible for us to study the stock first and then the question of variation.

As we take our trees from the nursery if we will observe carefully we will find that there is a very wide difference in the roots. While 100 or 500 may be uniform in the tops, yet if we study the roots carefully we will see a good deal of variation, and this variation will appear marked between different varieties. In buying trees it is important to see that there is a strong root development. I had rather plant a tree with a strong, finely developed root than a straight, beautifully grown top with a light root, and that is the misfortune of our propagation. Trees grown upon land that is made highly productive by artificial manures are forced into a magnificent growth and yet have but little development of the root. A tree of that kind may stand fifteen years and not produce an apple. I can say this, that I have set trees one year and they have produced

fruit the next. That comes from two causes. 1st, choosing the variety that shows a very early tendency to bear; 2d, taking fully grown and very strongly rooted trees, and then selecting the buds from those that show a very early bearing tendency.

Last year I planted 800 Rome Beauties, some of which bore the same year they were planted. And also the Duchess, which bore apples the same year the tree was set, and which were only two years old. They had been propagated on trees of specially strong roots. I believe the Spy to be an exceedingly valuable apple, yet they will grow for ten or twelve years before they show much tendency to bear fruit.

Another point, trees propagated in the right way will, like individuals, throw off and resist many of the troubles that are coming upon them at the present time. There are many forms of diseases and many types of insects which are today living upon trees, and you will find that the tree which is weakest in vitality is the tree that is always first attacked. If you have a lot of trees that are great, strong trees of stimulated growth, there is a class of trees that will be the first to be attacked by San José Scale. On such trees will be found first the blight or leaf-spot. There is always something the matter with these trees, because they have not enough vitality to resist these influences that are always present. We have no more diseases now than always, except that we have imported injurious insects, but we have planted thousands upon thousands of trees that had consumption when they were planted. They cannot stand anything, and we have unsatisfactory orchards simply because we have the wrong type of tree upon which they are started.

I believe that it is entirely possible for us to study and work out this principle and apply it to the propagation of trees before we plant them; and then introduce some very choice and valuable varieties.

I have here some specimens of the highest priced apples in the world, an English variety known as Cox's Orange Pippin. (Here shows apples.) It is rare in England, and that is why it brings such a high price, commonly one shilling, which is 24 cents of our money. You cannot buy one at a fruit store or any place in England for less than this price; I believe it is possible to introduce this apple in our country, and I have such faith in this idea that I have 250 trees growing and expect to ship the fruit back to England, where the people know it and will pay extra fancy prices to get it. The English people recognize the quality in this apple to be so fine that they are perfectly willing to buy them at that price. (I have only what I would call the seconds left, having given away so many.)

Characteristics.—In the first place, the texture is exceedingly fine; it almost melts in your mouth like a chocolate cream; the flavor is beyond anything I have ever known.

When this apple is just in its prime, if you were to put two or three in this room, in cutting them the aroma would be discovered in the room. It is as aromatic as a strawberry. English people like this apple when it is a little shriveled. Then the English consumer understands that its very highest flavor is developed, and that is why they are willing to pay the very highest price for it.

I am working this variety upon the Northern Spy, which I believe

will strengthen it, as it is somewhat delicate in its growth. Cox's Orange Pippin is not very strong in its foliage. The Spy has something of the character of Tallman Sweets or Northwestern Greening; and the Cox Orange Pippin could be worked upon either of these and they would have a tendency to strengthen and tone up the character of the foliage and give it development to the highest perfection in our own country.

I believe conditions in this portion of the State will be such that you may grow this apple to very high perfection, and if you could do this, I would not dare to say what you could realize per acre from fruit like this. I am afraid if I should you would have a land boom here that would be surprising.

Another point in regard to the influence of the scion upon the stock. The Northern Spy has this effect, that when a bud is put upon a seedling tree it influences its roots and makes the seedling a stronger rooted tree from the direct influence of the bud of the Northern Spy which is placed upon it.

While discussing this question before the Missouri Horticultural Society, Col. Evans, veteran nurseryman and fruit grower of the Ozark Mountain region, arose and said, "I thought I was the only man in the United States who knew anything about that," and he grew trees by the million. Said that in clearing the nursery blocks, after they had sold all the marketable trees, they would take one mule and plow up the rejected trees. But when they struck the Northern Spy they had to put in two mules; they never could plow out the Northern Spy with one mule. And, he said, this being the effect of the Northern Spy upon seedlings, why should not this be an available stock to work other varieties upon.

I discovered it through pruning the trees. Col. Evans discovered it from tearing the tree out of his nurseries. He worked from the root; I worked from the top. It was interesting that a man from the North and one from the South should have both made the same discovery working upon different lines. Col. Evans has raised some choice fruit from grafting upon the seedlings. The point that I made was that I wanted to have the vigor of the tree extended to the top, and I believe that I am getting it.

For a number of years I have been growing Sutton Beauty top worked upon Spy trees. This is a very choice apple; is somewhat similar to the Baldwin; is quite as beautiful as the Baldwin, and by many considered better. As grown by graft upon the seedling it makes a tree that grows very tall with slender limbs, which is not desirable.

I have been top working the Sutton Beauty upon the Spy to get the benefit of the Spy influence. I have sent grafts of the Sutton Beauty to Connecticut, and have in two or three instances been asked if there had been a mistake in sending the scions, as the grafts of the Sutton Beauty were twice as strong as those grown from their own tree. This seems to be a case where the stock influences the scion that is worked upon it. It gives to the Sutton Beauty strong, stalwart branches, and the fruit is fine in character.

Now, I selected a variety from a special tree in Geneva. S. D. Willard, nurseryman in Geneva, called my attention to the Sutton Beauty; a tree at his home. I was invited to dine with Mr. Willard, and I noticed this Sutton Beauty tree had a distinct type of its own.

Not the spindling tree that you find in New England, but a tree with uniform, beautiful spreading branches. I took buds from this tree, and worked them upon N. S. trees, purchased from Willard.

Willard has been against me in all this work, and he is a man who dislikes to take back an opinion, but I had an occasion to get back at him. While discussing this subject before the Horticultural Society at Rochester the question was up as to whether there was any advantage in selecting buds from selected trees, and if there was any real influence upon the stock. After stating my opinion, Willard stated his in opposition. I said I would give some facts: would not answer Willard, but would simply tell one or two facts. Then I gave the history of purchasing my Northern Spy trees of Willard and getting the buds from his own home, of transferring these, and five years afterward put the apples on exhibition at the State Fair at Syracuse. When the plate of apples was put out Mr. Willard ruled them out of the exhibition as not being true to name. One of my sons happened to be there, and at the time said nothing, but came back the next day and said: "Mr. Willard, you say those are not Sutton Beauties?" Then turning to the judges, said: "My father purchased Northern Spy trees from Mr. Willard and put upon them scions which he took from a Sutton Beauty tree from Mr. Willard's home." He then asked Mr. Willard: "Have you made a mistake?" After citing the incident, I remarked: "It is simply another illustration of a case where it is a wise father that knows his own child." An instance where Mr. Willard did not recognize his own.

There are Grimes Golden, found in New York, also Pennsylvania, Maryland and Virginia, which are very fine, and also McIntosh Red. I believe it is possible for us to take these varieties, which are of weak growth, and propagating from strongly rooted trees, selecting our buds from trees of strong, vigorous growth, and grow these choice, highly flavored, beautiful apples with profit.

Another word before I leave this part of the discussion. I am attempting a line of experimental work by propagating these choice varieties on dwarf trees. With the advent of the San José Scale—which has come to stay;—with the introduction of the Gypsy Moth, the Brown Tail Moth, and with another recent importation which is said to be worse, and to be far more destructive than even the Gypsy Moth, and with our close and extending international relationship with the countries of the world we are liable to be constantly getting new importations from other countries. There is no help for this unless we establish at once the most rigid quarantine regulations; and before these regulations are established we shall have dumped upon us other things worse than those of the present time. To meet this situation there is value in our studying the question of smaller trees, and I believe that the fruit grower of the future is going to turn to a large extent to the culture of trees of a smaller size that we may manage more successfully.

An orchard that was planted by my father sixty years ago, which is still bearing abundant crops, has trees in it fifty feet high. You can see the difficulty of caring for this orchard when the scale or the Gypsy Moth strikes it—and I am looking for them any time. After the importation of these pests into our country they will be distributed to different parts by railroads and various other means

of transportation, and when they come, the fruit grower who has his orchards thirty to forty feet high is in a helpless condition.

Another thing with high trees, the cost of handling the business is too great. Last year it cost me 20 cents to have the fruit from those high trees picked. Side by side with this orchard was another where the trees have been headed low; they were full of fruit, and yet it cost but 6 cents per bbl. to pick fruit from this orchard.

The question is going to be of sufficient importance for us to study the economy of planting a larger number of trees to the acre, giving higher and more intense cultivation. I believe there is profit along this line far above what we have thought of in growing fruit.

Q. Does it make any difference what part of the apple tree you take the graft from, whether from a limb, or a sprout?

MR. POWELL. In the selection of a scion from a tree I would study the individual tree, every branch upon it. The same line of variation that I have spoken of between trees exists with every tree itself as an individual. There are different parts of a tree that are better than other parts. We all recognize that. I would carry it out further and study the individual buds and take my scion from the very best part of the tree. I would not take it from a water sprout, but take it from the very best part of the tree.

Q. If the Northern Spy stock is good would we not get more of the Northern Spy strength by budding up high?

MR. POWELL. Am doing that now. Am buying a two-year-old tree and letting it stand for a year, then put buds in the branches.

Our nurserymen want a smooth, handsome tree, and they will cut off the lower branches, which is wrong. Every time they cut off these lower branches, they are impairing the tree. While it makes a strong growth, it does not make a stocky growth. I buy a younger tree before the nurserymen can prune it much. Then bring up the head the way you want it and bud around the branches of the Northern Spy.

Q. The Northern Spy does not make a satisfactory fruiting apple here. I wonder if there is danger of imparting that quality?

MR. POWELL. Perhaps the conditions may not be just right for the tree here. In that case would make careful study of trees that comes nearest to it in quality here. A strong-rooted tree like the North Western Greening may come nearer to it. You may have some native stock here that would give you the same thing that the Spy does. I would study the nature of the trees here. I would select a tree that is well grown with a strong root development and would experiment with the Spy. But would choose your strongest, best tree here. The Spy is a good tree in New York, but may not produce best results in a more southern climate.

SUCCESSFUL POULTRY RAISING AS AN ADJUNCT TO FRUIT GROWING.

By MR. FLOYD Q. WHITE, Yorktown, N. Y.

Mr. President, Ladies and Gentlemen: Introduced as poultryman, I hardly feel at home in a fruit growers' association, but I was a fruit grower before I was a poultryman, so I will come in with you as a fruit grower, and then we will talk chickens. If I were going to start in again at agriculture, the first thing I would do would be to select some specialty. It is an age of specialties, and we do not find the professions like we used to find them. Even physicians have their own line of specialties, and the specialist is the one who gets big prices, because he knows his business, and knows how to get the most out of it. If I were located in the West I would probably be a grain specialist; if in the South, corn or cotton would be my specialty; if near some great city, flowers, that is, within driving distance of a large city, but if a little farther out so that I could not drive in, yet had railroad facilities, and in a region that was a fruit growing section like this, I would be a fruit grower.

I believe there is more money in fruit growing in our section and in your section than any other branch of agriculture with the exception of poultry. We all know that there are certain things that nick in together; that each is the complement of the other. You take it in the house; our wives when we come in hungry and they want to get a favor, they do not give us pork and beans alone, but have pork and beans together; one is the complement of the other, and we are as good natured as a well fed hen when we get pork and beans. They nick in. I know of nothing that go so well together as fruit and hens—just like a pair of gloves.

On our place we have a two-story farm, with hens on the ground floor. In the first place, the fruit needs the hens. You have heard Mr. Miller tell how he cultivated and plowed his orchard as long as the trees lived. Mr. Powell says "cultivate." Well, we used to cultivate; we did plow our orchards, but every year the quality of help that you want and that you need to put in an orchard is harder to get. Once I set a man to plowing my orchard, and when I came home the trees were all wilted. I asked him what was the matter with them. He said he did not know. I went around and found that the trees were all loose. He had plowed them up and set them out again. Just the time when the orchard needs plowing—and if you want anything well done you have got to do it yourself—you ought to be spraying it. So there are perhaps two ways: first, to mulch, and that is expensive; no one has any idea how much labor and money has to be expended to mulch a large orchard until he tries it. And then the cultivation. That is the next thing, how to cultivate that orchard and how to do it the cheapest. Well, there are the hens, double-back-action cultivators, that work over time and

no extra charge, and they are a plagued sight safer in orchards than some men.

We took another orchard; we moved our chicken house, that we had out in the meadow, to that orchard. Now, the hen is almost as good a scratcher in the orchard as she is in the garden. She is not good for a garden, but she is good in an orchard. She beats Hallock's weeder all to pieces. If you have plenty of clover in that orchard she will eat clover and requires very little other food as long as the clover is there, but you want the hens in different parts of the orchard, so we carry the feed to different parts, and scatter it in the grass for the hens to hunt and scratch for.

Here is an instance of what hens will do for an orchard. We had a block of Baldwins where the hens did not go that were injured by the intense cold we had three years ago. In fact, we cut out one-third from some of the trees. They did not make any growth that year; did not make much growth the next year. Last year I built a poultry house in that part of the orchard seventy-five feet long. This summer these trees were rank green. There were not many apples because they were not in condition to make buds, but they will be full another year. Two hundred hens saved these trees.

The most ideal place for a hen in hot weather is in an orchard. She is at home. You will not see her with her wings standing out and her tongue lolling; she will work all summer.

Q. Will the rotten apples falling to the ground sour the soil?

MR. WHITE. If you have many hens in that orchard there will not be an apple that will be allowed to rot. It will be eaten up before it gets to that state. The question was asked me if eating so many apples would injure the hens or stop them from laying. I said "no." This last year I have tried it; have followed it right up. I had a flock of hens in a plum orchard; did not get an apple to eat. Hens right over the fence in an apple orchard had all the apples they could scratch amongst. The hens in that orchard kept a good record, and ahead of those that had no apples.

When your hens get very thick in the orchard you are going to have ground as bare as bare can be. If your houses are seventy-five or eighty feet long you cannot move them, and it is not safe to let these apple trees go into winter with the ground bare, so we bring in lots of straw, weeds, grass and everything we can scrape together on the farm. It makes an ideal place for the hens to scratch in the fall when there is not much grass, and the apple trees go into winter quarters with a couple of inches of mulch.

The varieties of apples grown in a poultry yard would surprise you. I could almost rival Mr. Powell's story about apples being thrown out. Mr. Fowler, editor of the New York Farmer, threw out variety after variety of our apples at Syracuse State Fair as not being correctly named. After the judging was over, we cut them and he found that they were all rightly named.

Too much nitrogen will make the apples pale, lacking the bright color that is needed for the market, but that is the only offset against the many gains from having the hens in the orchard. The crops are immense, sometimes breaking the trees down. The Hubbardson grows so large we do not take the largest specimens to fairs because we know the judges will throw them out. And the same is true of the Rhode Island Greenings.

Nowadays we have to have our orchards so that we can drive all over them with a spray rig, and a spray rig on a big fruit farm is quite a combination. We built our first house almost in the middle between the rows of trees. But the new house was built on one side close to the row of apple trees. You want the roof of the house just as near flat as you can get it, not more than three feet pitch in twelve, for the reason that you have got to work around over the top of these houses when you are spraying, because the man who sprays the trees has got to be put on the top of these houses. That is something that will be very hard to do in case he is trying to work on the steep roof of a chicken house.

Another nice thing about hens in an orchard, you will take good care of the hen lice if you are in the orchard with a good spraying rig and you know you can kill every germ by spraying inside of the chicken house. I never knew how handy it was to take care of a chicken house and get rid of pests until I had the chickens in the orchard and went right through the houses with sprays, using the lime sulphur mixture.

About the varieties of poultry I shall say nothing either one way or the other. The variety that a man loves and is interested in that is the one he is going to make succeed. I do not care what kind it is, though it is the old Dominicks, if he likes those and is interested in them he will take care of them. The breeds he likes are the ones he will care for. A large poultry raiser once told me that he liked one breed and his poultryman liked another, and the one that the poultryman liked was the one he gave the greater part of his attention to. You have got to almost live with your hens if you are going to make the most of them; you have got to know them. I had a boy working for me; I was away for a time, and when I came back he said to me, "Boss, how is it when you take care of the hens you get more eggs than I do; I feed them just the same as you do." I said, "Tommy, I talk to them." A few days after that a gentleman from Geneva was at our place and he said, "Is there anything the matter with that boy you have got out there? I heard the funniest conversation out there in the poultry yard as if he were talking to the hens. I thought he had a screw loose in him somewhere."

Now, as to quantity, when you hear a man talking about getting 1,500 eggs from 1,000 hens, put him down where he belongs. They won't do it. I think we do as well with our hens as anybody that has got the number that we have, but we cannot reach these figures. One man told me he got 1,900 eggs a day. I asked his poultryman a short time after that how many hens Mr. So-and-so had, and he said "1,100." Of course, he is doing better than I am—a good deal. We think if our hens pay a profit for ten months in the year we can afford to keep them for two months for the pleasure of their company, and we do it. This is the first year that we have been in the poultry business that our hens have paid us a profit in the month of November—a very small profit. I do not know why. If you had 1,000 early hatched pullets you could make a tremendous big rake, but a man cannot afford to raise pullets and as soon as they get a year old, get rid of them, because a hen will pay a good deal more in twelve months than a pullet can in seven months, a pullet being a dead expense up to the time it is five months old, whereas a yearling hen will

not lay quite so many eggs in the winter when eggs are high, but there is a big difference between sixty days and five months idleness.

There is one more point I wish to make. I said that poultry and fruit growing will nick in together. In old times when I was a boy, there were just three good seasons on the farm; when we got the crops in we would all go fishing before they got ready to hoe. Then we had to stay at home and hoe corn. When we got the crops laid by we went fishing again. When the harvesting was over we all went fishing once more. Now, we have got a line of business on the farm that keeps us busy. It is not rush one season all you can and then rest up all you can. You are hustling from Thanksgiving to Thanksgiving. Twelve months you are hustling. Labor with fruit comes in summer and fall; labor of hens in winter and spring. If you get behind, you will never catch up. It is 1, 2, 3, 4, with hens and chickens all summer. By Thanksgiving time you ought to be in pretty good shape.

Fancy prices for goods can only be got by an intimate knowledge of your customers. We have been offered 10 cents a dozen over and above the market price for eggs this fall and won't take it, for the reason that we have had some of our customers fifteen years—very profitable customers. I received letters the other day from two hotels in New York city, one of them saying: "When can I have all the eggs I want, right from the farm?" The other hotel wrote me: "I must have eggs; twice as many eggs as you are sending."

We commence in January and give these hotels all they want up until October. Then we have to cut them for October, November and December. If you will explain to your customers that it is not your fault, it is the hens' fault, they will forgive you.

DISCUSSION.

Questions and answers by MR. WHITE.

Q. Do you get that price all the year round?

A. No, just at this time. The Boston market will pay two cents a dozen more for brown eggs, and New York will pay two cents a dozen more for white eggs. You will have no trouble if you can fill your orders and get your customers established.

Q. What is the best winter food for poultry?

A. Mixed grain twice a day and hot mash of wheat-bran, corn, oats ground, and meat scrap twice a day. We boil potatoes and turnips and things like that; meat scrap and anything we can get from butchers.

Q. Do you use any cut bone?

A. No, have too many hens to cut bone for.

Q. What time of day do you feed mash?

A. Noon; never feed a hen hot mash in the morning. If you feed it in the morning a hen won't scratch. A light feed in the morning; give them hot feed at noon, and at night all they want of grain.

Q. What grain?

A. Equal parts of wheat, corn, barley, oats and buckwheat, if we have it. Corn is all right in winter, but not too much of it.

Q. Have you ever covered hens with spray mixture?

A. Yes.

Q. Do you feed hens on apples in winter?

A. No; turnips or beets are better.

Q. How many hens do you put in an orchard?

A. Two hundred and fifty to the acre. Can put in more.

Q. How much profit do you realize annually per hen?

A. We average $2 clear profit per year upon a hen, not counting labor.

Q. Do you keep them housed in winter?

A. We always keep them housed in winter.

Q. Is there any artificial heat in houses?

A. No. Every house has at least one muslin curtain. Every bright day the curtain is up. On stormy days it is down. Cold does not hurt a hen, but a storm is bad for her.

Q. Any outside run in winter?

A. No; but it is all opened up by raising this curtain.

Q. What is the size of your house for 200 hens?

A. Seventy-five feet long, 12 feet deep.

Q. How divided?

A. Divided in 6 parts, 12½ feet each, 12 feet deep, makes almost an ideal pen for 30 to 35 hens.

Q. Do you think they should be divided to that extent?

A. Yes; particularly when you are going to use them for breeding. We get better results from a flock of 35 White Leghorns than we can in a big flock. It may be on account of strong hens crowding weak hens out, particularly with the grain pan, when the poor, weak hens are liable to be injured.

This house, built one year ago last fall, is 75 feet long, 4 feet high rear and 7 feet front, 12 feet deep, two windows in each pen, one muslin and one glass. The muslin hinged at top and opening up against the roof, turning each pen into a shed in daytime. The nests are under the dropping boards and the perches over them, fastened to short pieces of joist so we can move them handily in cleaning. The nests and dropping boards will all come out so that we can get at all parts of them with oil or spray mixtures.

Session Thursday evening.

The convention was indebted to Miss Winnifred S. Woods, of Carlisle, Pa., for the Thursday evening entertainment, her subject being "The Land of the Incas," profusely illustrated. Miss Woods took us from New York via steamboat to Panama, thence down the west coast of South Amreica and returned to New York. Her descriptions were most interesting and the excellent slides gave the audience a vivid picture of the many quaint and curious customs and costumes of that but little known part of the continent. It was altogether a most instructive evening. Miss Woods was assisted by the Arendtsville Glee Club, who sang a number of bright, catchy songs.

Morning session, Friday, December 14.

CABBAGES, "A LIFE STRUGGLE."

By RICHARD VINCENT, JR.

Mr. President, Ladies and Gentlemen: I am pleased to be with you this morning. I am not one of those people who travel all over the country and talk. I am not a lecturer and not in the business. Do not make my living that way, and one point about it, I do not know but what the possibilities are that you will be disappointed after you hear me. I have not a line, even a scratch of anything written out. I am a plain, practical worker, and if I can in a few remarks this morning help any one here it is my earnest wish to do so. That is one reason why I am here.

In giving the history of a life struggle there are some things which we do not care to bring up before an audience, and yet if we can help another in his own efforts we think it is our duty to lay aside personal feeling in the matter and seek only the end we have in view, that is, to guide and assist as far as possible some of our fellow creatures who are making a struggle for advancement on the same lines that we are.

My father was doing a large business in growing small fruits, flowers and vegetables in the old town of Rugby, England. Troubles came, and as business was broken up and he saw no possibility of getting up in the world in England, he decided to emigrate to a new country and first selected New Zealand as the place where he would make his home. But New Zealand was such a long way from England that he abandoned that idea and as he had some friends in the State of New Jersey he decided to go there.

I came to this country when eleven years of age. My father was then employed with a florist on Long Island. I had very little schooling; in fact, never went to school long enough to learn to write my name. All the education I have having been acquired by my own individual efforts without an instructor. When my father put the question to me whether I wanted to go to school or to work, I thought, "Well, I will go to work and try to do the best I can to educate myself." I got what I have by burning midnight oil.

I served an apprenticeship of two years and then came over to Elizabeth City, N. J., and started in the nursery business. I was then in one of the largest and finest nursery businesses in the United States. That was the year 1861. But my father had taken charge of a nursery in Brooklyn. I went to assist him. I stayed there a few years. The nursery was on the farm belonging to Richard Cromwell. The nursery was operated by a son. Mr. Cromwell had a truck farm of 250 acres. One day I saw the old gentleman talking to my father. He called me and said, "Here are my keys; go over and take charge of my farm." That was a pretty predicament for a young fellow of twenty-one to be placed in. I had never had a plow

in my hand. In seven or eight days he came to the farm and said, "Well, how is everything?" I said, "Just so. I will give you the keys and go home." But he asked me to take lunch with him, said he wanted to talk to me. "How would you like to take charge of this place?" he asked me. I said, "What do you mean?" He proposed that I should take entire charge of the farm at a salary of $600 a year, also allowing me a horse and my expenses. I stayed two years.

The principal crop was cabbage. The first year I was there the old gentleman said to me, "Vincent, make a selection of the cabbage for sets." I planted 100 cabbage sets in ground where manure had been dumped for years. From that day to this I have never seen cabbage produce like that did. Out of the 87 head that we put out we saved 87 pounds of seed. That 87 pounds of seed was worth $870. I was very proud of it and asked the old gentleman if it had ever happened before. He said that was the second time it had happened on his farm. The first time was on a larger scale, that time covering half an acre, which produced 300 pounds of seed selling for $3,000.

The first year I was there we put in the usual crop of kraut cabbage, which was about 300,000 plants, but when marketing time came 120,000 were not taken out of the field.

I was afraid my boss would look upon that as a bad piece of business and perhaps would be discouraged and not want to go into it again. I said, "Mr. Cromwell, last year I put in a crop of 300,000 cabbage plants and they brought nothing, did not pay expenses. What shall I do this coming year?" He said, "If you can plant 400,000, do so." We had a very bad season for plants next year and instead of 400,000 only got 275,000, but every one brought $80 per thousand.

That fall I left him and took a place of my own. Had a splendid house, nice grounds and everything pleasant, but the farm was of the poorest quality. I found that I had made a bad deal, but we managed to pull through the first year. The second was a year of disasters: Stock sold very low, and with the poor condition of the soil it was impossible to come out even. The consequences were I had to abandon that place and all I had put in it, leaving it some $3,000 in debt. I lost in that transaction somewhere between $7,000 and $8,000.

I went from there for a season with my brother, who had a farm over in Harford county, Md. In the fall we moved to our present home. It was very cheap, and I, like the rabbit, had to seek shelter somewhere out of the storm. I thought in looking the place over I was making no mistake. It had plenty of conveniences and I thought that by cultivation the land might be brought into good condition. The farm was an old tobacco farm. Nothing had been grown on it but tobacco until the life was out of it. It had been turned out and allowed to grow up into sassafras and pine bushes. The house and stables were nothing but shanties. I got it simply because I had no money, and the man who sold it to me let me have it on time, for he knew he would lose nothing, because he had nothing to lose.

Everybody said I would never succeed. That everything I laid my hands on went wrong. In marketing I did like a good many others do. I hauled my stuff to the wholesale market and when I got in

there I would say, "Please give me something for this and let me get home," until I got tired of that kind of business. I thought I would get a little nearer the consumer. I rented stalls in different markets; grew less in bulk, but more in quality. I tried also growing strawberries, peas and sugar corn, which my patrons wanted, but stuck to cabbage always because there was always a market for it the winter through, and if I did not get much for it, I got something.

We steadily improved. Cabbage had been doing tolerably bad for some time and people said there is no money in cabbage; why does that fellow continue to plant it? Some of my brothers-in-law were engaged very largely in trucking, many of them in the wholesale market in Baltimore. One of them came around one summer. I always had something in the ground, for I never let it be clear. Would put in kale sprouts, because if there had not been a good market in the spring you could get something for your kale sprouts. This year I had put my ground in kale sprouts and had sown a little rye in it. I said, "John, I want to ask your advice. I have an idea of putting in a large crop of cabbage this season. I have been putting in about 40,000 for my fall and winter market. But this year I think I will put in 120,000 to 150,000." "Where are you going to put them?" he asked. "Why, you see that rye in that corn stubble?" "How about the money to put them in? Cabbage has not sold for much for over ten years. I think if you would harvest that rye you would get more than you would out of cabbage. It would only bring you deeper in debt." "Now," I said, "John, I got money enough to pay for my fertilizer; I always pay my labor as I go along. When that crop of cabbage is grown there will be no mortgage on that. I want that crop of cabbage to be a mortgage lifter." He said cabbage has brought a very poor price for the last four years. I said there is going to be a turn and I am going to put it in, sink or swim.

I put that crop of cabbage in—145,000. They brought me $7 per hundred. That helped to lift the mortgage off the farm and it built us a home and fixed us up comfortably. Not only that, it gave us the start that we needed. With God's help it helped us to build up a family and a home. I felt satisfied, trusting in the Great Master, that success would come sooner or later. It did come, and has never deserted us since. Of course we do not know what misfortune may come to us, but while I am engaged in growing flowers and other plants, by faith is still pinned on cabbage. And why should it not be? I am the largest grower of cabbage plants today—letting the other man grow the cabbages. I do not know anybody that handles any more plants. I have made that statement over this country, and if there is any man that raises more than I do I want to know it. The month of November of this year we sent away a million cabbage plants for the other fellow to grow to cabbages. The main part went down in what we call Patapsco Neck in Baltimore county.

There are one or two curious types in cabbage. One grows way down in the southern ocean on the Island of Desolation. Ships sailing in these seas always make a trip to Desolation Island to gather up the cabbage, because this cabbage is one of the best things for scurvy that has ever been discovered. I believe that nowhere on the globe is this same variety found. There is a curious thing about

it. Cabbage seed have to be fertilized by a winged insect, but there are no insects on that island. The wind is so strong around that coast that if a winged insect should attempt to go there he would perish. It seems that wherever one thing has failed the Creator has provided another, and there the wind does what the insect does here.

A few years ago traveling in the Channel Islands I saw a good many canes exhibited for sale. They called them cabbage canes. I supposed they were from some tree or shrub. Driving along we came across a patch of cabbage—what they call Jersey cabbage. It grows taller than a man. They cut the stalks and sell them for curiosities.

DISCUSSION.

By MR. VINCENT.

Q. How many cabbages do you plant to an acre?

A. About 4,000.

Q. What fertilizer do you use?

A. Those that I raised for Mr. Cromwell stood two-thirds manure and one-third horse manure. We used to use what we call Booby Owl, which contained a large percentage of muriate and a little dissolved bone. These were the principal ingredients.

In the March and April sowing of 25 acres we use one ton of bone and 250 pounds nitrate soda to the acre. Same ground was put in cabbage this fall without any fertilizer except a little muriate, and one patch we gave a little 6 per cent. guano.

Q. Does nitrate of soda force cabbage?

A. Yes.

Q. How do you apply it?

A. Broadcast.

Q. Do you use Lobos guano?

A. Yes; I get from Baugh. I also use Baugh's bone.

Q. Do you sow seed in drills?

A. Yes; plants last year covered 35 acres, 25 acres of cabbage, 5 of celery and the balance in tomato plants.

Q. How long did it take to grow these plants?

A. We put them in the first of March and they were ready for sale the 25th of April to the 1st of May.

Q. How many crops can you grow on the same ground?

A. Two crops a year.

Q. What is the advantage of people buying plants in November?

A. The plants they buy in November they are planting now. A great many people are not aware of the immense amount of cabbage planted in Maryland to stand over the winter.

Q. Can we do that here?

A. I do not know. If you plant cabbage the same as we do, I do not see why you should not plant both fall and spring.

In planting in the fall the plant should be set very deeply in the ground, for if the stalk is exposed to the action of the winter it cracks and invariably goes to seed. It is to prevent the stalk from cracking that you put it down out of sight.

Q. What do you do for root maggot in the seed bed?

A. We do not have it. You would be astonished at the amount of plants that go from us to the trucking region of Long Island simply because if the plant is clean when it goes out of the seed bed it very seldom is affected afterward. I believe the majority of trouble with cabbage occurs in the seed bed.

PROF. PARROTT: Our greatest problem in Geneva is to control the maggot in the seed bed. Have tried a number of insecticides, but nothing cures it. We are going to try to ditch it.

Q. Do you fumigate the seed?

A. No; we aim to buy good, clean seed. If you get hold of a bad, dirty looking seed, do not plant it. It is no use. It is diseased. Last year the party that supplies us with our plant seed sent us 25 pounds of seed and it all looked so bad, so we wrote him about it and he said it was just affected by the weather. We lost many plants from this sowing. I am satisfied the disease was carried in the seed. The only way to prevent the evil would be to soak the seed in something before planting.

BUSINESS EXPERIMENTS FOR THE CONTROL OF THE SAN JOSE SCALE.

By PROF. P. J. PARROTT, Entomologist N. Y. Experiment Station, Geneva, N. Y.

In 1894 the San José Scale was discovered for the first time in this State in two distinct communities. In one, the infestation was entirely confined to Beurre d'Anjou pears, which were destroyed by fire; and, in the other the scale was found in three nurseries, in which an attempt was made to exterminate the scale by burning the infested trees and by spraying the plants in the immediate vicinity of those destroyed. At that time fears were expressed that infested stock had for several years in the past been distributed to the trade and that the scale was then quite likely in many communities where its presence was unsuspected. The results of official inspections which were made soon afterwards verified these fears. According to C. L. Marlatt, the counties in which the scale is now widely distributed or is doing considerable damage in restricted areas are Albany, Cayuga, Chemung, Columbia, Dutchess, Erie, Kings, Nassua, Niagara, Ontario, Orange, Orleans, Putnam, Queens, Rennselaer, Richmond, Rockland, Suffolk, Wayne, Westchester and Yates. It is also known to be present in the following counties: Broome, Chatauqua, Delaware, Fulton, Greene, Jefferson, Madison, Monroe, New York, Oneida, Schenectady Schoharie, Schuyler, Senaca, Steuben, Tompkins, Ulster and Washington. There are, then, thirty-nine counties out of a total of sixty-one, in which the scale has been recognized. It is safe to say that this pest is now present in all of our leading fruit-growing sections.

During the past twelve years the pest has steadily gained ground, its distribution this year being especially marked; and this progress has been accomplished in spite of the warnings to our fruit growers to avoid suspicious stock, and the efforts to exterminate the scale and to prevent is dissemination through the avenues of trade. With each succeeding year the present infested areas will become larger and the spread of the scale will continue until eventually all those engaged in the production of fruit will find it necessary to give their trees annual treatment for this pest.

Some Insect Outbreaks in the Past.

Whether or not the scale will eventually be less destructive the future will show. The experience with unusual outbreaks by destructive insects, either native or introduced, has been that for a period of years there was first a remarkable development in the numbers of the insect and a rapid and widespread distribution of the species over a more or less extensive area of country, accompanied with great destruction of crops. After this rapid rise to such prominence, the insect has usually become less numerous and destructive, and finally there was greater harmony between it and its host-plant. For example, the wheat midge, an insect pest, imported into this country about 1820, was exceedingly destructive in some of the eastern States from 1835 up to about 1860, when it seemingly disappeared. In New York alone the midge was estimated to have caused a loss of $15,000,000 and the value of wheat land dropped from $70 to $40 an acre. In spite of these losses by the midge, farmers continued to grow and harvest wheat. The midge, while it still attacks wheat, is much less destructive than formerly and this grain is still profitably grown in increasing areas of this continent.

Up to the autumn of 1865 it was believed that the insect now known as the Colorado potato beetle found its subsistence upon a worthless weed, when all of a sudden it took to eating the potato plant and commenced to migrate eastward, from potato patch to potato patch, consuming, as one writer says, "the vines like a devouring flame." With the progress of the insect a hue and cry went across the entire country, as potato growers were fearful of the future of their industry. The apparent hopelessness of potato growers may be understood from the following extract, which fairly represents the opinion of the leading authority at that time upon the most efficient methods of protecting potato vines from this beetle:

*"I might occupy page after page in detailing the experiments that have been tried by myself and others. But of all the mixtures recommended I can seriously recommend none. They are impracticable on a large scale and require too frequent repetition to be efficient, as the beetles issue from the ground day after day. White hellebore, Paris green, slaked lime, etc., I have proved by experiment to be valueless, though the first two will kill if thoroughly applied, a

*First Am. Rpt. on the noxious, beneficial and other insects, Mo. State Board of Agriculture, page 116.

certain proportion of the larvae (slugs) but will not affect the beetles. I therefore again impress upon my readers the importance of prevention by killing every beetle which first appears in the spring. There is no better way of doing this than by crushing them on the spot, and for this purpose a very simple pair of pincers may be constructed." Then follows a picture of the pincers, made from two pieces of wood, a screw and two strips of leather.

It is hardly necessary to say that today we are controlling not only the potato beetle but also the potato blight, a more destructive pest, and that potato growing is still a profitable industry.

In 1873 the scale first attracted the attention of fruit growers at San Jose, Cal., so that this species has been known in this State for thirty-three years. Mr. Ellwood Cooper, (2), the Commissioner of Horticulture, says that the scale was as great a terror to our growers some twenty years ago as it now is over a great part of the United States, but one of our native parasites adapted its taste to it and has increased with almost unprecedented rapidity until it overtook the scale; and today this scale is no longer a pest in the California orchards. It is true that it makes its appearance in remote sections but never to any dangerous extent. So little attention is paid to the San José scale now that we never recommend any action against it. Before this parasite did such effective work California orchardists were having very much the same experience that their eastern brethren are having now, and trees by thousands were dug and destroyed to get rid of the scale. It is to be hoped that the days of this terrible pest in the eastern orchards are numbered, for it has been discovered that the same parasite which has freed California orchards is now at work here." It is said by Professor C. W. Woodsworth (1) of the California Experiment Station, that the scale may be readily found in at least 25 per cent. of the orchards, in injurious numbers, in probably 10 per cent. in any one year, and that from 25 per cent. to 40 per cent. of the orchards are sprayed with the lime, sulphur and salt wash every year. The scale has been present in Arizona, but has practically dropped out of sight because of a succession of hot, dry years. In New Jersey (1) it is said that the fruit sections where the scale has been longest present are in better condition than those where the appearance of the scale is of more recent origin, because the growers have learned by experience how to fight the insect. In Nevada (1) the scale is pretty well under control. The scale (1) is well distributed in the leading fruit areas of Oregon, but it is reported that the scale does no great injury except in small farm orchards or those that are neglected, and that in all the large orchards the sulphur mixtures as a winter spray are in general use. The scale (1) is pretty well distributed in the central section of Utah, but is doing very little damage, being apparently controlled by the twice-stabbed lady-bird. Commercial orchards are practically free. The sulphur washes have been extensively used in the past. In 1890 the scale was discovered in the State of Washington and it is now known to be present in the important fruit growing sections. "It (1) is little dreaded by orchardists and fruit trees are commonly sprayed with the sulphur wash in February, and one treatment is reported to be

(1) Cl. Marlatt, U. S. Bureau of Entomology, Bull. 62.
(2) Ellwood Cooper, First Biennial Report of Commissioner of Horticulture of California, 1903-1904.

effective for several years." In the fierce struggle for existence plants have, by the elimination of the weaker individuals of its kind and the survival of the stronger, developed self-restorative and more resistant qualities to withstand the attacks by destructive insects. To check the inordinate increase of such enemies there are also predaceous and parasitic insects, birds and other animals and unfavorable weather conditions which tend to preserve a more harmonious relationship between the insect and its host. The general conditions under which a plant grows must to a degree be also favorable to its insect enemies, but there must be some minor conditions produced by the agencies mentioned which are more favorable to the one than to the other. Long, long ago a balance was established between plants and insects, and if by the importation of injurious insects the destruction of prairies and forests, etc., the equilibrium is destroyed and an insect becomes a menace, as is the San José scale today with us, I cannot help but believe that some outside agency or agencies, operating beyond our control, will eventually restore the plant and its parasite to a more stable basis. These statements are not made to raise false hopes or to promote shiftlessness or neglect, but rather to encourage our fruit growers to renewed efforts to save their trees and to prevent a needless destruction of their orchards.

The Requirements to Fight the Scale Successfully.

The present situation for many orchardists in their first experience with the scale is a serious one and it will require very careful and persistent work on their part to keep this pest in control. Every fruit grower having scale on his premises should be familiar with its appearance and its work, and select a remedy which best suits his individual needs. There is now a good list of scale sprays, such as sulphur washes, miscible oils, home-made oil emulsions, and clear oils, each of which possess certain merits, and if intelligently used will give reliable results. Successful as these sprays will prove in the hands of an enterprising fruit grower, it should be understood that to get satisfactory results they cannot be used ignorantly nor will they succeed in incompetent hands. An orchard when once infested will require treatment every year to keep the pest in control, as it is now necessary to spray each year for the apple scab and codling moth.

Annual Spraying a Necessity.

In the future we shall frequently hear of injuries by the scale because some orchardists for one reason or another will not succeed every year in combating this pest, any more than they are successful in controlling the apple scab and the codling moth. There will be for some time to come complaints of the inefficiency of sulphur washes and other scale sprays, as there have been expressions of discontent in the past with Bordeaux mixtures and the arsenical poisons. Careless fruit growers will gradually lose their trees and fruit trees for shade purposes will to a large extent disappear. In the orchard only profitable trees will be sprayed, while the worthless trees will fall by the axe. It will cost more to raise clean fruit but the increased cost of producing high grade fruit will undoubtedly be

covered in part by economies in other orchard operations, by the employment of better and business like methods in the management of the trees. As fruit growers gain experience in fighting this pest they will gradually develop a system of spraying that is best adapted to their requirements, and, when once the habit of regularly spraying the infested trees is formed, there will not be much more concern for the scale, except as it occurs on old trees, than is now felt for a number of other destructive orchard insects. The scale is today being efficiently and profitably controlled upon peaches, plums, pears and apple trees of moderate size at a cost of $8 to $16 an acre. With a good list of sprays from which to make a choice, I can see no reason why an orchardist should fail to protect such trees by seasonable thorough spraying with known remedies.

Spraying of Old Apple Orchards.

In the treatment of apple orchards when the trees are old and high, spraying for the scale has not for the most part been successful. As a result there are in localities where the scale has been longest present, many complaining that to attempt to save the old orchards is impractical, as it is impossible for them at a reasonable expense, by known methods of treatment, to keep the trees sufficiently thrifty to produce profitable fruit yields. Disheartened by the unsatisfactory results attending their efforts, some such orchardists have now given up attempts to save the larger trees, which are dying, thus eliminating one of the principal sources of income of the farm. If such destruction on account of the scale is to continue, and should become general in every community in which the scale is introduced, it will not be long before the older apple orchards will go out of existence. To protect the apple trees is today the most important phase of the scale problem.

Experiment on Old Apple Orchards.

Realizing that the present situation with respect to the scale would likely occur, the Geneva Station, in order to ascertain the difficulties that are to be encountered in the spraying of large trees, and to determine if there are practical methods of protecting commercial apple orchards, undertook to co-operate three years ago with a number of fruit growers, especial attention being given to old trees. It is intended to continue this co-operative work until satisfactory conclusions can be drawn as to the best treatment of infested apple orchards. One of the most important of these is the experiment in Mr. A. H. Dutton's orchard at Youngstown. While the work has not been completed, it is thought best to show what is being accomplished and to point out as far as present knowledge permits the best methods of treating large trees infested with the scale.

The Youngstown Orchard.

This orchard has an extent of twenty acres, consisting of 598 trees of at least 45 years of age. The leading varieties are Baldwin, Greening, Spitzenberg and King. The San José scale was discovered in 1900 upon one Greening and by 1903 the scale had practically

spread throughout the entire orchard. In 1904 the Greenings, rows 2—6 on the east side, were literally covered with the scale and the fruit on them was practically worthless because of the spotting by the scale. There were also marked evidences of injuries, as whole branches and occasionally a large limb were dying. Spitzenbergs on rows 7 and 8 had considerable spotted apples, as did the Baldwins on rows 9, 10, 11 and 13, 14 and 15.

In 1905 crude petroleum was applied to 204 trees, boiled lime-sulphur wash to 345 trees, and in 1904 the orchard was sprayed with the sulphur wash and kerosene limoid to 47 trees. The items of expense for spraying orchards are as follows:

COST OF SPRAYING APPLE ORCHARD IN 1905.

Crude Petroleum.

Twenty barrels of crude oil at $4.60	$92 00
Three men for three days at $1.50,	13 50
Team for three days at $2,	6 00
Wear on sprayer (2½ per cent. of cost),	11 25
Total	$122 75
Number of trees sprayed,	207
Cost of oil per tree,	$0 44
Cost of labor and team per tree,	09
Cost of treatment per tree,	59

Sulphur Wash.

3,750 gallons of sulphur wash:	
1,125 pounds sulphur at 2¾ cents,	$30 94
1,500 pounds lime at 45 cents per cwt,	6 75
Fuel,	3 00
Four men for five days at $1.50,	30 00
Team for five days at $2,	10 00
Wear sprayer, (2½ per cent. of cost),	11 25
Total,	$91 94
Number of trees sprayed,	345
Cost of sulphur wash per tree,	$0 12
Cost of labor for making wash per tree,	02
Cost of labor per tree,	10
Total cost of treatment per tree,	27

Kerosene-lime Wash.

1,000 gallons of kerosene-lime wash, 25 per cent. oil:	
250 gallons of kerosene at 10 cents,	$25 00
1,000 pounds lime at 50 cents per cwt,	5 00
Four men for 1½ days at $1.50,	9 00
Team for 1½ days at $2,	3 00
Total,	$42 00

Number of trees sprayed,	69
Cost of wash per tree,	$0 43
Cost of labor for making wash per tree,	03
Cost of labor per tree,	14
Total cost of treatment per tree,	60

COST OF SPRAYING APPLE ORCHARD IN 1906.

Boiled Lime-Sulphur Wash.

10,000 gallons of sulphur wash:	
3,000 pounds of sulphur at 2 3-4 cents,	$82 50
4,000 pounds lime at 45 cents per 100,	18 00
Fuel,	4 00
Seven men for nine days at $1.50,	94 50
Two teams for nine days at $2,	36 00
Wear on sprayer (5 per cent. of cost),	22 50
Total,	$257 50
Number of trees sprayed,	586
Cost of sulphur wash per tree,	$0 18
Cost of labor for making wash per tree,	02
Cost of labor per tree,	20
Total cost of treatment per tree,	44

The following table is a general summary of data given, showing number of gallons of each mixture used to spray one tree and cost of treatment:

TABULATED GENERAL SUMMARY.

Name of Spray.	Averages per Tree.			Cost of Treatment.	
	Number gallons.	Cost of spray.	Cost of labor.*	Total per tree.	Average per acre.
Petroleum,	5	$0 44	$0 09	$0 59	$17 70
Sulphur wash,	14	15	17	36	10 80
Kerosene-lime wash,	14	43	17	60	18 00

*Includes labor in making spray.

On this basis the cost of spraying orchard with crude oil would be $354, with the boiled lime-sulphur wash $216, and with the kerosene-lime wash $360.

Results of Sprays on Tree and Scale.

The applications of crude petroleum in 1905 to rows 2—10, inclusive, delayed leafing three weeks and destroyed the fruit crop. It was the most efficient spray on the scale, the effects of which lasted through 1906. The trees at this time are in much better condition than in 1904. The sulphur washes caused no injuries and were not usually as effective as the oil. The kerosene-lime mixture severely injured fifteen trees and gave variable results on scale. The treatment with the sulphur washes in 1906 caused no apparent injuries

to the trees. The general appearance of the trees in early summer was better than in 1904, due to the greater improvement of the Greenings. During September and October the scale was unusually prolific, resulting in more or less spotting of the fruit, which in this respect was marketable. The crop of Greenings, with the exception of the fruit of two trees, was quite clean. The Spitzenbergs and Baldwins apples on rows 7 to 12 were very clean. The worst infested part of the orchard was along a ditch through rows 14 and 17 and the northern part of rows 21—25. The scale was well controlled in the east half of the orchard, but was more abundant in the west half. The fruit was much injured by the codling moth, the control of which was not a part of the experiment.

Summary of Results.

The sulphur washes are cheap, safe and reliable sprays for the treatment of peaches, plums, pears and apple trees of moderate size. They are especially recommended for the treatment of peaches for the joint control of the scale and leaf-curl. The applications of any spray must be thorough, so that all parts of the trees are coated with the mixture. Good nozzles and a pump with high pressure to produce a fine spray are essential. The cost of spraying per tree is variable, depending on manageement, weather conditions, labor, kind and cost of fuel and spraying supplies, and degree of thoroughness in spraying. In spraying trees from five to eight years of age the cost of treatment will vary from 5 cents to 13 cents per tree in commercial orchards.

The treatment of old apple orchards has not usually proven successful, largely due to lack of thoroughness in spraying. The best results on scale have been obtained by orchardists by the careful pruning of the trees and spraying with the sulphur washes and crude petroleum in alternate years. By this system of treatment orchardists that were fearful of losing their orchards have this year marketed comparatively clean crops of apples. In a test in one commercial apple orchard the average cost of spraying one tree of 45 years of age with the sulphur wash was 36 cents and with crude petroleum 59 cents. The crude petroleum has proven the most efficient spray on scale, but it is very likely to cause injuries. It is believed that for the results obtained in commercial apple orchards that applications of a sulphur wash at an approximate cost of 60 cents per tree, or crude oil emulsion (25 per cent. oil) would prove equally effective on scale without risks of appreciable injuries to the trees.

SCALE REMEDIES.

Crude Petroleum.

For spraying purpose a grade testing about 43° Beaume should be used. Most efficient spray on scale but dangerous if used in excess on trees. Apply clear petroleum on old apples only on a sunny day, as buds swell and stop spraying when oil commences to run on bark. Only nozzles with fine apertures should be used. Resort to oil treatment for apples only advised after failure to control scale by sulphur wash.

Home-made Oil Emulsions.

Kerosene emulsion.—Dissolve one-half pound of soap in one gallon of boiling water. Remove vessel from near the fire and add two gallons of kerosene. Emulsify the whole by pumping it continuously through a small force pump until a creamy mass is formed, from which the oil does not separate. This is the stock material. For a mixture containing 10 per cent. oil dilute the whole of stock material with 17 gallons of water and for a mixture containing 25 per cent. oil dilute stock material with 5 gallons of water.

The 10 per cent. oil mixture may be used as a summer spray to check breeding of the scale. If this strength can be used safely on the foliage, increase the percentage of oil gradually in remaining preparations until a 25 per cent. oil mixture is reached, if no injuries to foliage in the meantime follow. A 25 per cent. oil emulsion will kill both young and old scales, and may be safely used for the treatment of trees in early spring as buds are swelling.

Crude petroleum emulsion.—Dissolve one-half pound soap in one gallon boiling water and stir in one-quarter pint of liquid crude carbolic acid (100 per cent. straw color). Remove vessel from near the fire and add two gallons of crude petroleum. This should be emulsified after the manner of making kerosene emulsion.

For a mixture containing 25 per cent. crude petroleum add five gallons of water to the stock material. This is advised for the treatment of trees in the spring as buds are swelling.

Proprietary Oil Emulsions.

A number of these proprietary emulsions, known as Scalecide and Kil-o-Scale. etc., are now on the market. They are handy preparations for treatment of few trees and when conveniences for preparing home-made remedies are wanting. To obtain satisfactory results, two applications should be made, using from 7 per cent. to 10 per cent. of the stock emulsion. The reliability of the sprays rests with the compounders.

Sulphur Washes.

The boiled lime-sulphur wash:

Lump lime,	20 pounds.
Sulphur,	15 pounds.
Water,	50 gallons.

Slake the lime with hot water and make a thin whitewash. Stir in the sulphur and boil mixture one hour. Dilute mixture with water to make required amount of wash. Flowers of sulphur and light and heavy sulphur flour may be used. This is the best spray for the average orchardist and is especially recommended for the treatment of peaches. Should be applied to dormant trees in spring.

Cost of Spraying Mixtures.

With copper sulphate at $7 per hundredweight, Paris green 25 cents per pound, arsenate of lead at 14 cents per pound, lime at $1.10 per barrel, sulphur at $2.50 per hundredweight, caustic soda at 5 cents per pound, sal soda at 2 cents per pound, kerosene at 12 cents per gallon, limoid at $2.50 per barrel, Scalecide at 50 cents per gallon, crude petroleum at 11 cents per gallon, whale-oil soap at 4 cents per pound and crude carbolic acid at 39 cents per gallon, the cost of the raw materials for making one barrel, 50 gallons, of the several mixtures is as follows:

1.	Bordeaux mixture,	$0 38
2.	Bordeaux mixture with ¼ pound Paris green,	44
3.	Bordeaux mixture with 3 pounds arsenate of lead,	80
4.	Lime-sulphur wash,	50
5.	Lime-sulphur-sal soda wash,	70
6.	Lime-sulphur-caustic soda wash,	81
7.	Kerosene-Limoid wash (10 per cent. oil),	82
8.	Kerosene-Limoid wash (15 per cent. oil),	1 23
9.	Kerosene-Limoid wash (20 per cent. oil),	1 64
10.	Scalecide (5 per cent.),	1 25
11.	Scalecide (8 per cent.),	2 00
12.	Scalecide (10 per cent.),	2 50
13.	Crude petroleum,	5 50
14.	Kerosene emulsion (10 per cent. oil),	65
15.	Kerosene emulsion (25 per cent. oil),	1 56
16.	Crude petroleum emulsion (10 per cent. oil),	67
17.	Crude petroleum emulsion (25 per cent. oil),	1 67

Friday afternoon.

STATE WORK FOR CONTROLLING SAN JOSE SCALE.

By D. K. McMILLAN, Harrisburg, Pa.

Ladies and Gentlemen: It is a great pleasure to me this afternoon to appear before this audience. There are several reasons for this. One is that this is my home county and I feel very much at home here. As I look around over the crowd I see that almost every person here is personally known to me. I have known many of you a long time. Of course, that makes it very interesting for me to be here. I do not get here very often, but when I do I like to meet the friends that I have known and appreciated. Another reason is that this talk comes right after dinner. I think possibly most of you may be in a better humor at this time than you would have been in this morning or much later in the afternoon, and for fear that your humor may change somewhat I will not take up too much time, so that the speaker who comes after me will not be at a disadvantage.

My talk will be for a few minutes on the State work against the San José Scale. We have heard this morning about the scale and what it has done; its terrible possibilities for injury, etc., from Prof. Parrott. I do not need to cover any of that ground at all, but simply to tell you of what the State of Pennsylvania under Prof. Surface has been doing to help the farmers oll over the State in controlling this terrible pest. If you could go out over the State and see the injury that is being done you would appreciate the greatness of the problem that confronted our department a year ago—or little more.

When this work was taken up we did not need to go very far from here in order to understand the conditions. Adams county presents, for example, just such conditions as are to be found in most counties of this State. San José scale is found at present in nearly all of the counties. I believe four or five of our counties, so far as our knowledge goes, do not have any scale. It may be—and most likely is—that the orchards are not so extensive and fruit growing is not so important, so that we have not had it brought to our notice.

The great problem that we had was the campaign of education to bring before every fruit grower in the State the importance of learning the scale and of taking active measures to promptly effect its control and extinction; and the chief difficulty in this State is the ignorance by orchardists and fruit growers or owners of trees on private grounds; ignorance of the scale, ignorance of its presence, or what scale really looks like.

The plan that was arranged by Prof. Surface was to educate the farmers of this State. I do not know how many there are, but you can see that it was a big problem, say 250,000 persons to educate as to the dangers and the remedies for controlling the San José scale. Now, how to reach these people in the shortest time possible was a serious question, and so when the State appropriation was called for a comparatively modest sum was asked when we considered that problem. The Legislature two years ago appropriated $30,000 for each year; $60,000 for two years' work. This work was started last fall, practically only thirteen months ago. The appropriation was made available some time in June. As the summer months were at hand very little could be done in that line of work which Prof. Surface had planned. His plan was to secure competent men, who were to go through every section of the State, go into every county, every township, and hold demonstrations or meetings to aid in the work of educating the farmers and fruit growers. There were appointed about twenty-five demonstrators and the work was begun some time after the beginning of November. These men were assembled and had a very thorough course of instruction from Prof. Surface, both at State College and at Harrisburg. They learned how to manipulate the apparatus; learned to prepare the mixtures and were given a pretty thorough course of instruction, not only as to San José scale, but other orchard pests and the remedies for them.

These men started to work early in November and I among the number was given a district. It is possible I may be able to tell you items from my own experience later, but I may not be able to reach it.

During the fall term, not as many demonstrations were arranged and carried out as we had hoped, as a large part of the work was taken up with inspections preparatory to the orchard demonstrations. In the spring and during last fall there were 183 demonstrations given throughout the various districts. The average attendance at these demonstrations was about 20, or perhaps a little more. They vary, of course, and on very bad days there would not always be so many. Sometimes we would have an attendance of 300 to 400. In some meetings in Lancaster, Berks and other counties the attendance numbered as many as 400 farmers and persons from the towns. A good percentage of the attendance was made up of ladies. At nearly all my demonstrations last fall there were a good many

ladies, and they took a good deal of interest in this work and asked a great many questions and showed their desire to learn as much about it as possible.

As to demonstrations this year, during the months of July, August and so on, up to this time, there have been made throughout the State about 9,000 inspections; 9,000 premises have been visited and carefully examined for the scale, and of course owners have been told whether or not the scale was present. There have been given this fall about 175 demonstrations. The reports are not all in yet and of course I cannot say definitely. So you see with an average attendance of about 20 at our demonstrations last spring there would have been about 3,660 persons attending these meetings.

If no other feature of the work had been done but to reach that many persons and make them acquainted with the scale and have them see by concrete example just how to prepare and apply the best remedy, it woud justify the expense of the appropriation that was made and the State could feel well repaid for the outlay of money. But a great deal more has been done than that. Wherever these demonstrations were held it has created a great deal of interest, and people have begun to spray immediately on their own premises. The value of the work in that respeect we can scarcely estimate.

Concerning the growth of spraying as a result of our demonstrations, I want to state a few figures that I recently obtained. In 1903 in Lancaster county, taken as an example, there were six persons who had been doing spraying; in 1904 there were 23 persons who had begun the work; in 1905, last fall, there were 70 persons who were beginning to do active work in spraying. In 1906, when these figures were obtained (June), 93 persons had begun active work for the scale. Now, you can see what a rapid increase, 6, 23, 70, 93. I suppose if we were to take a census at the present time we would find a great many more in the work.

In some of these counties there was not a single person who had attempted to do any spraying. In many places I visited last fall many of these people could not tell a spraying pump from a washing machine; had no idea how a spraying pump was to be worked. Many were afraid to touch my machine; afraid it would explode; they were ignorant simply because they had not come in contact with it; many in a large measure had never seen scale. More than 90 per cent. of the people I visited last fall had not seen it; did not recognize it on their trees. Our inspections show that 75 per cent. of the orchards have scale in them. I said 90 per cent. in my case, I believe. Many of the reports show about 1 in 5 who know the scale when they see it.

As an aid to this work Prof. Surface has issued a Monthly Bulletin. As most of you know, it has been coming with more or less regularity in the last few months. Last November and December there were two editions, 25,000 each, of this Bulletin published, making 50,000 treating San José scale exclusively.

In February, 1906—that is eleven months ago—there was another Bulletin issued, dealing almost exclusively with scale; that made 75,000 copies, and recently there have been two other Bulletins, a large part of which have been taken up with the scale question. Thus we have 125,000 copies of the Bulletins dealing almost exclusively with this subject. Our Bulletin goes into all communities

in the State, and the education upon this subject through this one means alone is inestimable. The publications by Prof. Surface from our office averages over one page of literature for every day during these last three years, and a little more, so that you can see that the office has not been idle, and I think there are fewer harder working institutions in the country than the office of the State Zoologist in the last three years since I have been connected with it.

I may not have given you all the details of this work, but I think you can have an idea of what we are trying to do. The mainspring in this work has been Prof. Surface, who has pushed it along as possibly no one else in the State that I know of could do. Now the campaign, I might say, is practically open; it is only well started, however. We are going to carry it out along these lines just as energetically, just as vigorously as we have in the past.

I might say something about remedies. Prof. Surface instructed the demonstrators in preparing and applying the material and in the treatment of the scale. He emphasized the lime and sulphur washes and I think we have had enough endorsements of it in the talk by Prof. Parrott this morning. Many persons asked me why I recommended these remedies. The answer invariably was: It is, in our experience, the most effective remedy for the scale itself. Another reason, the materials for the lime and sulphur washes can be obtained in any community in the State. Lime is abundant and of course sulphur is cheap and convenient to get. The preparation is not a serious problem at all. Any person who has once seen it made can prepare it for himself and can get results if he follows directions. The application is not difficult at all.

One of the reasons why the lime, sulphur and salt wash has been effective is that you can always see where it has been applied and in the second treatment of the trees you can treat every part of the tree, because the places missed during the first application are very plain.

There is another thing about these demonstrations of ours. They are encouraging the fruit growers of the State; many of them were discouraged. In some places that I visited they declared emphatically that they would make no efforts to raise any more fruit. They had lost their orchards; their trees in many cases were dead; they thought the thing was hopeless. But as we heard this morning, the results of careful work were encouraging and many of the farmers took heart again and started in for the salvation of their trees and have had splendid results.

I learned coming down on the train this morning in an orchard of 600 trees that was recently sprayed with lime, sulphur and salt wash the trees were so bad they thought it was useless to make any effort to spray them. It was too late to save all of them and 200 died, but 400 recovered and this last year they were in beautiful condition and the prospects for a good crop this coming year are excellent. (Prof. Surface: That was in the orchard of Nathan Banks, of Mifflin, Pa. Anyone could get the facts themselves.) So you see that a few examples like that in each community will be sufficient to encourage the surrounding neighbors to do this work, if they have not done so before, and to encourage them if they have done so before and failed. And if the results are not immediately apparent—that is the results cannot be apparent within a month or so, or possibly a year—but

I feel sure that the results during the next few years to come will more than abundantly justify all the efforts that have been made.

Now, there is great deal more to be done, of course, but as I said, 183 demonstrations were given last spring; 175 this fall. Yet every community has not been touched and there are doubtless many people in the State that were not able to attend these demonstrations, but during the coming spring campaign efforts will be made to reach these communities where no demonstrations were given last spring or this fall, so that within another year every farmer in the State will have had a chance to visit these demonstrations and learn for himself by an actual object lesson how to go about the work of fighting the scale; and if there are persons who have not attended these demonstrations the blame cannot be laid at the door of the State Zoologist. The efforts that we are making certainly show that the Department is awake in this matter, and every person ought to co-operate in the work.

In our field work, of course, we always make it a point to hold the demonstrations where we can get the best results from them—in an orchard where there is scale and in a community where there is an abundance of scale if possible; and the orchard owner must cooperate in furnishing team and giving assistance with labor and so on. Demonstrators furnish the skill and instruction and show how to prepare the wash. The material and apparatus we carry with us. But we must have the co-operatoin of the people. It is for the public benefit, and if they do not co-operate or show any interest they cannot expect much result.

There is this question of the State law regarding persons treating trees. I will not say very much about that, but the question comes up very often. It did last fall. A man would ask, "What am I to do with my neighbor who will not spray his trees?" The only thing we could say in answer was, "A man must be educated; he does not realize the gravity of his condition. He is like a man who has a disease and will not believe he is sick or that his condition is serious. The law is here to be enforced. Where people are ignorant or prejudiced against the law—which you will find in every community in regard to various laws—it is hard to enforce any law if people oppose it."

Regarding treatment of scale on trees on private premises, we hope before long that much good will come from them, and while it may be difficult for people to spray their trees as the law directs, we believe that spraying will be done upon every property in the State of Pennsylvania. At least that is the idea that we hope to realize.

A great deal of work has been done in this community within the few square miles surrounding Bendersville, but there are a great many people in Adams county who need to be awakened and I am hopeful that before many months there will be additional organizations similar to this—or such increased membership of this organization that the farmers and fruit growers will be brought together and co-operate in this great work. I think there is no greater future along agricultural lines than in fruit growing. The San José scale within the last few years seems to have arisen as an effective barrier to this, but as we have learned, in communities where scale has been the very worst, where persons have had necessarily to make vigorous efforts, the results have been such that people have had great success in fighting the scale.

DISCUSSION.

Q. What kind of sprayer do you use in your work?

MR. McMILLAN: Gould's "Pomona" sprayer is one of the good spraying pumps on the market, is convenient and easily carried around from place to place. Operated as a hand pump. It would have been very difficult to use a larger piece of apparatus with the rapid trips that we had to make from one place to another. Last fall, while it was not a serious operation, my back and arms got a good deal of exercise in lifting that pump.

Q. What kind of nozzle do you use?

MR. McMILLAN: Vermorel nozzle or the Mistry nozzle, which is a modification of the Vermorel and gives good results. I do not have any trouble with that nozzle clogging, or very little, at least, if the wash is properly prepared and strained.

Q. What kind of strainer do you use?

MR. McMILLAN: We use a medium size strainer of galvanized tin, and the important feature of the strainer is the cone-shaped gauze through which the liquid runs. The larger the cone the less trouble you will have in straining.

PROF. SURFACE: That is most important in using the lime and sulphur wash. I sprayed for a whole day without nozzle clogging after using a strainer like that.

MR. McMILLAN: All details are given in our Bulletin, copies of which can be obtained free by every person in this room. Bulletins contain all formulae necessary for your work.

Following Mr. McMillan, Prof. H. A. Surface, Economic Zoologist of Pennsylvania, addressed the convention on the subject of "Latest Information on San José Scale and Codling Moth Remedies." The subject was treated exhaustively and listened to with a great deal of interest. Not being able to secure manuscript in time for publication we are obliged to forego a detailed report. Prof. Surface's conclusions were, however, that lime and sulphur are the best remedies for San José Scale, and that a commercial insecticide known as "Disparene" (the trade-name for a fine grade of arsenate of lead) or a combination of the same with Bordeaux making a combined insecticide and fungicide known as "Pyrox," are most successful in controlling codling moth.

REPORT OF FRUIT COMMITTEE.

By GABRIEL HIESTER, Chairman.

We are very much pleased with the character of the exhibition. Well grown, well colored fruit, free from blemish; varieties carefully selected with a view to good market values. I think we found only one or two apples in the whole lot that were not good, marketable varieties. That is a strong point in Pennsylvania in making an exhibit of apples. For the trouble is that we have so many varieties, in making an exhibit of this kind probably one-half is based on apples that would not sell on the market, and for that reason we think this is a very good display. We find 107 plates of apples; 16 exhibitors. We went over the shelves and selected of each variety the apples which we considered the best, because we thought the man who furnished the best plate of apples ought to have the credit for it; and this is the list that we have made up:

Fruit Display.

Best plate of:

Golden Russet, Domine, Dickinson, Ben Davis, Langford Seedling, Robert M. Eldon.

Fallawater, Smokehouse, Peck's Pleasant, Bullock Pippin, W. S. Adams.

Jonathan, Stark, Rufus Lawver.

Smith's Cider, Red Doctor, Anthony Deardorf.

Baldwins, York Imperial, York Stripe, Winter Paradise, C. J. Tyson.

Stayman Winesap, R. M. Richardson.

The following is a list of exhibits:

Seeds and Vegetables.

Cloud's Yellow Dent Corn, C. A. Griest.

California Beauty Potato, Iona Seedling Potato, J. C. Bucher.

Gold Coin Potato, Burpee Potato, I. R. Garretson.

Mammoth Pearl (two plates), Wolf Bros.

Sir Walter Raleigh Potato, White Star Potato, Josiah W. Prickett.

Early May Potato, Joel V. Garretson.

Scott's Seedling Chestnut, Franquette Walnut, Parisienne Walnut, Joel V. Garretson.

Apples.

A. F. Weidner, 3 plates, 1 Grimes' Golden, 2 Jonathan.

Mrs. Raffensperger, 4 plates, 1 York Imperial, 2 Ben Davis, 1 Smith Cider.

W. S. Adams, 13 plates, Domine, Winter Doctor, Bullock Pippin, Falawater, York Stripe, Winter Paradise, Krauser, Spitzenburg (wrongly named but not recognized), Ben Davis, York Imperial, Smokehouse, Peck's Pleasant, Unknown, not able to name).

Geo. R. Routzahn, 3 plates, 2 York Imperial, 1 York Stripe.
Joel V. Garretson, 5 plates, Smith Cider, York County Cheese, York Imperial, Domine, Baldwin.
Chas Michener, 5 plates, 2 Smith Cider, 3 York Imperial.
Geo. P. Myers, 3 plates, 2 Ben Davis, 1 unnamed (believed to be Langford Seedling).
C. A. Griest, 3 plates, 2 Winter Rambo, 1 Baldwin.
Anthony Deardorf, 6 plates, 2 Red Doctor, 1 Smith Cider, 2 York Imperial, 1 Ben Davis.
Robt. M. Eldon, 17 plates, 4 Ben Davis, 1 Dickinson, 5 Smith Cider, 1 American Russet, 2 Domine, 3 Langford Seedling, 1 Delaware Red Winter.
Josiah W. Prickett, 6 plates, 5 York Imperial, 1 Ben Davis.
R. M. Richardson, 3 plates, Stayman Winesap (very large and perfect) exhibited by George H. McKay, Philadelphia.
J. H. Peters, 3 plates, Smith Cider, Ben Davis, Domine.
Rufus Lawver, 3 plates, Jonathan, Stark, York Imperial.
Gabriel Hiester, 2 plates, Mother Apple, Lawrence Pear.
C. J. Tyson, 26 plates, 12 York Imperial, 3 York Stripe, 3 Domine, 3 Baldwin, 2 Winter Paradise, 2 Rhode Island Greening, 1 York Imperial and Baldwin (crop of 1905 from storage, in fair condition).

MR. GABRIEL HIESTER: I think the best work can be done if we have associations like this meeting frequently in the different districts, and then if these local associations will come together once a year in our State association we can help the fruit industry in Pennsylvania. That is what we are trying to do, trying to induce fruit growers to organize local organizations, and then we want you to come and join with us in our State meetings once a year.

The meeting will be held this year on the 16th of December at Harrisburg and we hope to meet in the new capitol, so that we can all enjoy that elegant building.

MR. ELDON: We all appreciate Mr. Hiester's remarks, and we expect a great many of us will attend his meeting in Harrisburg.

Please accept our thanks for examining fruit.

Friday Evening Session.

Mr. Vincent opened the session by some remarks on the "Beautifying of a Country Home," which were listened to with marked interest, after which Prof. Surface entertained the convention by giving his illustrated lecture on "Insect Friends and Foes." The audience was very much interested and instructed by several hours of that most fascinating topic, "Nature Study," and the only regret was that time required a cutting out of many slides. The Pennsylvania College Orchestra from Gettysburg furnished music for the evening and their part of the entertainment will be remembered as one of the very enjoyable features of the convention.

PRESIDENT ELDON: We have now come to the close of our second annual convention and I feel that every session has been crowded with interest and pleasure. It has been indeed a feast of good things from which each may select that which meets his own special needs and store it away for reference in the year to come.

I wish to express the gratitude of this association to the speakers and visitors for the great help they have been to us, for the many valuable suggestions they have left with us. To one and all, I cordially invite you to come again next year.

A RECORD TO BE PROUD OF.

Pennsylvania's Position as a Fruit Growing State.

As Pennsylvania has few very large commercial orchards compared with some of the Western States, it was a matter of surprise and interest to us to discover her real position as shown by last census, and thinking it may be of interest to others will reproduce the figures here.

The total value of fruit produced in the U. S. in 1899, $131,400,000
The total value of fruit produced in Penna., in 1899, 9,900,000
Pennsylvania's proportion of total value of U. S. fruit, 7.5 per cent.

Value of fruit produced by States in 1899:

California, first,	$28,000,000
New York, second,	15,800,000
Pennsylvania, third,	9,900,000

Bushels of apples produced in 1899 in order of states:

New York, first,	24,100,000
Pennsylvania, second,	24,060,000
Ohio, third,	20,600,000

This shows Pennsylvania to be second in bushels of apples and third in value of all fruits with 7.5 per cent. of the entire value, a record to be proud of.

OUTLINE OF INVESTIGATIONS IN HORTICULTURE RECENTLY UNDERTAKEN BY THE PENNSYLVANIA AGRICULTURAL EXPERIMENT STATION.

The object of this investigation is to determine the causes which affect yield and quality in apples, and to secure definite data on each over an extensive range of territory.

The varying results of previous horticultural investigations have made clear one thing,—that orcharding is a local problem and demands local study. The successful orchardist must be an experimenter, in the true sense. To do this he needs assistance, and that is what our State Experiment Station is proposing to give.

The factors now under consideration are: (1) the influence of commercial fertilizers and barnyard manure; (2) influence of cultural methods, alone and in combination with different fertilizing; (3) effect of the time and amount of pruning, including thinning and girdling; (4) effect of types of soil; (5) influence of climatic conditions, including elevation and exposure; and (6) the value of selection, in the propagation of apples.

Experiments along the first two lines are being installed in different parts of the State, in bearing orchards or in those just coming into bearing. The fertilizer experiment involves four acres and ten treatments, with six checks. The experiment on cultural methods involves eight acres and twelve treatments. The action of these experiments in young orchards will be studied in special plantings in favorable localities, which are being selected for operations next fall and spring. The other lines will be cared for in due season, some of them demanding special planting.

Thirty-five hundred circular inquiries, covering these and other points, have been sent out to apple growers throughout the State. It is very desirable that these be filled out and returned.

Any apple grower owning 100 trees or over, who has not received a circular, or any orchardist desiring further information concerning these experiments should communicate with

JNO. P. STEWART,
State College, Penna.

Respectfully submitted, June 17th, 1907.

SUSQUEHANNA FERTILIZERS

A LITTLE PLAIN TALK

The employment of Artificial Manures for promoting the growth of our crops has become such an established practice that their assistance is now justly regarded as essential to remunerative farming.

The great object of a successful farmer is to raise from a given extent of land the largest quantity of the most valuable produce, at the least cost and in the shortest period, at the same time keeping his land in good condition and even improving.

Every farmer should look upon his farm as a bank ; every crop he takes off it is a draft upon the strength and fertility of the soil, and must be returned to it in properly prepared manure, containing those elements of vegetable life which the crops abstracted therefrom, otherwise the land will degenerate in quality and value.

To buy what we need as cheap as possible is the universal desire of all, but seeking for low prices in fertilizers with the idea that they are cheap has led to many disappointing results. High grade Fertilizers cannot be made from low grade materials any more readily than fine cloth can be made from shoddy, and the sooner farmers come to take this rational view of the matter the better it will be for all concerned.

SUSQUEHANNA FERTILIZERS are scientifically prepared from the best materials ; they are prompt in action and permanent in effect ; in short they are first class in every respect. A continuous and increasing trade with the best Pennsylvania farmers, extending over a period of 27 years, speaks for itself.

Agents Wanted in Unoccupied Territory

EDWIN C. TYSON

General Sales Agent **FLORA DALE, PENNA.**

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